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The Structure of Trade of Trinidad and Tobago

By and large, Trinidad and Tobago is a typical Caribbean economy with a plantation history. There exists a long-standing legacy of structures making for firmly established patterns of production and trade based mainly on the sugar industry and a few other agricultural exports. During the nineteenth century, some diversification of output took place away from sugar and towards other agricultural products such as bananas, cocoa, citrus and coffee. The base of the economy was later expanded by the discovery of petroleum. During and after World War II, significant changes occurred in public economic policy as more executive power was gradually transferred to the Government of the island and some impetus was given to the promotion of small-farm residentiary agriculture. This has contributed to further diversification of the economy.

The export sector, though very large relative to national product, comprises few products, some of which are sold in tenuously held and protected metropolitan markets; this is the case particularly with sugar and fruits. The main export, petroleum and its products, are the most important single source of foreign earnings and government revenue.

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SOME APPLICATIONS

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THE MINERAL EXPORT SECTOR

BAUXITE

We have outlined a theoretical statement on metropolitan enterprise and mineral industry in the Hinterland Caribbean economies. The two industries from which these general principles were mainly derived are examined in Section B. The industries concerned are those of bauxite and petroleum, which are major sources of income creation for six Caribbean economies.

Both these industries are operated by the modern form of metropolitan enterprise known as Multinational Corporations. The products of both are important, in fact strategic, inputs into the metropolitan industrial complex, chiefly that of the North Atlantic. As such, these industries represent latter-day forms of the incorporation of Hinterland resources into Metropolitan economy by means of Metropolitan enterprise.

Taking each industry in turn, we shall first review the technological events which gave rise to its commercial birth in the Metropole. The development of demand for the commodity will be outlined. Then we examine the circumstances under which the industry came to be dominated by a single firm or a small number of

large, vertically integrated firms. The particular value of vertical integration to these firms and in the industry is analysed. The conditions under which the firms became multinationalised, and drew the Caribbean into their complex of activities, are examined.

Next, we analyse the process of output determination for the Caribbean mineral industry as a process of decision-making by the particular MNC's in the industry. Then, we take a select number of Caribbean countries, showing for each the development of its mineral industry, and discussing output and income-determination in the light of the history of the commodity and the MNC's which produce it.

Bauxite

Bauxite is used chiefly for the manufacture of aluminium metal. A discussion of the bauxite industry, therefore, must be based on an analysis of the development of the aluminium industry. It is the production of aluminium which gives the derived demand for bauxite ore, and bauxite is in fact produced chiefly by aluminium companies which have integrated backwards to secure supplies of the chief raw material required by their metal production facilities.

(i) Technological Background

Although aluminium is the most abundant metal in the earth's crust, it occurs nowhere in its free state and is most frequently found in combination with oxygen. Aluminium ores also commonly contain silicon, iron and titanium. The existence of the metal was confirmed in the early part of the 19th Century, and it began to attract attention principally because of its light weight in relation to its strength.[1] Large-scale commercial production, however, had to await an economical method of extracting the metal from its ores, since the traditional smelting methods used for older metals such as iron and copper were not suitable for aluminium.

The method was provided by the rapid development of the science of electrochemistry in the latter part of the 19th Century. "The introduction of an effective dynamo" indicates Wallace "gave a great impetus to experiment with electrometallurgical and electro-chemical methods of reducing highly refractory metallic compounds."[2] For aluminium, the breakthrough came in 1886, when Hall in the United States and Heroult in France each independently discovered a means of reducing the metal. The method consists in essence of bringing to a molten state a mixture of aluminium oxide and aluminium's double

flouride - cryolite - and passing an electric current through. This drives off the oxygen and leaves molten aluminium behind.

Virtually at the same time, K.J. Bayer perfected the technique by which aluminium oxide - alumina - is extracted from the most common aluminium ore, known as bauxite. [3] In this process, the bauxite is first crushed and ground into fine particles, and calcined to drive off the free moisture. It is then "washed" with a solution of hot caustic soda, which dissolves the alumina and leaves the remaining elements behind. Alumina crystals are then precipitated by "seeding" the solution with hydrated alumina. The crystals, when washed and calcined, become a fine white powder which is then ready for the reduction of aluminium.

These two processes - the "Bayer" method of extracting alumina (beneficiation) and the "Hall-Heroult" method of extracting aluminium (smelting) - have become characteristic of the bauxite-aluminium industry all over the world. There have been substantial improvements, modifications and adaptations to both methods over time, resulting in increased efficiency and lower real costs. But they remain basic to the industry and to its differentiation into various stages of production.

These stages can be conveniently divided into four:

In the first, mining and drying, the bauxite is removed from the earth, crushed and calcined. The second and third stages, beneficiation and smelting respectively, have already been described. In the fourth stage - semi-fabrication - aluminium ingot is worked by such methods as recasting, rolling and extruding, to produce such products as rod, sheet and wire.

The existence of clearly demarcated stages of production in the industry has a twofold significance of relevance to our analysis. First, it means that the various stages can be, and in fact are, widely dispersed by geographic location. Traditionally, mining takes place where the deposits occur, smelting near to sources of abundant, low-cost power, and semi-fabricating near to markets. Beneficiation is fairly 'footloose', taking place sometimes near to the ore supplies and sometimes near to smelting. Secondly, the existence of these stages has meant that vertical integration of the firms in the industry was of particularly great value and had particularly important consequences.

(ii) The Growth of Demand and of Output

Whereas technological progress was responsible for the birth of the commercial aluminium industry, both technical and structural changes outside of the industry gave rise to the rapid rate of growth of demand for the new metal.

Two industries were of critical importance to aluminium's early process of growth: electricity and automobiles.[4] The one induced a growing demand for transmission cable, the other for metal parts. Aluminium was well suited to supply both needs. As cable, it weighed less than half a copper cable of equal conductivity; as metal for automobile parts, it was much lighter than the older competitors, if softer and of low relative strength. The latter disadvantages were in large part remedied by the development of copper and zinc alloys of the pure metal. Thus, aluminium found two large growing markets for metals where it was able, by virtue of its peculiar properties and the maintenance of a price advantage, to displace the older metals in many incremental uses.

The two World Wars in the 20th Century have provided enormous stimuli to the growth of demand for aluminium. For one thing, the wars

accelerated technical progress in the use of aluminium and in the development of more and more alloys of the metal. For another, it demonstrated far more effectively than commercial advertising the broader and broader range of uses to which the metal could be put. The First World War was chiefly responsible for the emergence of the metal as a chief material in the growing aviation industry; the Second was important in broadening its application to all forms of transport equipment and to a new use, the building industry. Both wars also induced a substantial growth of capacity which could then be diverted rapidly to satisfy peacetime civilian demand.

The period since the Second World War has been marked by the growth of the use of the metal in the building construction industry, its continued importance in the manufacture of transport equipment, and the proliferation of its application to a large number of durable consumers' goods. This process has received considerable assistance through the continued development of aluminium alloys and of new ways of working the metal.

The high rate of innovation within the industry, the attractive properties of the metal, and its price competitiveness relative to its main substitutes, have all contributed to the displacement by aluminium

of the older metals in incremental consumption. Consumption of aluminium is now higher than that of any other non-ferrous metal. Displacement, together with high income-elasticities for metals as a whole associated with structural change in metropolitan economy, has been responsible for very high rates of growth of demand. An indication of this is given in the following Table.

Table 1 - Indications of world aluminium consumption, 1900-1965.

	World Total	Percent Increase Over Previous Figure
Production: 000 Metric Tons		
1900	7.3	
1910	43.1	+ 490.4
1920	128.0	+ 197.0
1930	266.1	+ 107.9
1938	582.4	+ 188.6
Consumption: 000 Long Tons		
1950	1557.4	
1960	4147.2	+ 166.3
1965	6262.1	+ 50.0

Sources: Wallace, op. cit. Appendix Table 38, and Huggins, H.D. Aluminium in Changing Communities, p. 235, 238.

The Table shows that high growth rates have been characteristic of the industry since its inception, and that the period since the Second World War has been one of extremely high absolute and relative growth. From all appearances, aluminium is now in a veritable Golden Age. Consumption in the United States, where per capita use is highest and where the possibilities for substitution for other metals are coming close to exhaustion, is nonetheless expected to grow at twice the annual rate of growth of the Gross National Product in the late 1960's and early 1970's. This is expected to give rise to a minimum rate of growth of consumption of between 6 and 8 percent per annum.[5] In Western Europe, where per capita consumption is lower, consumption was projected to grow by 136 percent in the eleven years between 1959 and 1970.[6] In lower-income areas where the utilization of the metal has yet reached the intensity characteristic of the United States and Europe, the annual percentage growth of demand may be even higher than that in the latter two markets.

Table 2 gives the trends in aluminium consumption by country and region since 1950.

Table 2 - Trends in Aluminium Consumption, 1950-1965

	1950	1965
Percent World Aluminium Consumption		
United States	52.0	44.2
Canada	3.7	2.4
Western Europe	25.0	23.4
Centrally Planned Economies	15.6	21.2
Japan	1.2	5.2
Rest of the World	2.5	3.6

Sources: Calculated from Data in Huggins, op. cit. p. 238 and Girvan, N. The Caribbean Bauxite Industry. I.S.E.R. 1966. p. 36

The important changes have been the relative decline of the United States, Canada and Europe in world consumption, and the rise of the share of the Centrally Planned Economies and of Japan. It should, however, be borne in mind that North America and Europe were experiencing falling shares of a rapidly rising absolute total. The absolute volume of consumption by North America and Europe increased by some 3.5 million tons in this period, some 249 percent of the 1950 level.

World production trends are shown in Table 3.

Table 3 - Trends In the Shares of World Production of Primary Aluminium by Countries and Regions, 1900 - 1965

	Percent Total World Output		
	1900	1935	1965
United States	44	21	36
Canada	-	8	12
West Europe	56	69	
Centrally Planned Economies	-	24	22
Japan	-	4	4
Australia	-	-	1

Sources: Calculated from Data in Wallace, op. cit. and Girvan, op. cit. p. 27

In the middle of the great depression the United States' share of world output had fallen relative to the beginning of the century, and that of Western Europe had increased. By the end of the Second World War, however, the United States share of world output had increased substantially. The share of the U.S. and Canada was still 48 percent in 1965, but in recent years this share has again been falling and that of Western Europe rising.

(iii) Metropolitan Enterprise. (a) Alcoa and Monopoly

The Appropriation of Technology

As the history of aluminium as a commercial metal dates from the technological breakthrough in electrolysing alumina, so does the history of the organisation of the industry start with the appropriation

by a firm of this technology through patent rights. In Europe four firms were operating under the original patents of Hall and Heroult by the turn of the century. However, in the United States, with which we are principally concerned, it was a single company which emerged with patent rights. It thereby obtained a strategic head start in the industry in its early years which helped confer upon it a long-lasting monopoly position. This firm was the Pittsburgh Reduction Company, formed in 1888 by Hall and a number of Pittsburgh investors. To quote Wallace:

> "The Hall and Heroult process was essentially too simple to permit patentable modifications or variations upon the basis of which competing firms could be established during the life of these two patents. It was as if a law of nature had decreed that the intense competition of many would-be parents should yield a single type of child fitted for survival, while man-made law prohibited imitation during its youth. The competition of inventors induced a monopoly of production." [7]

The period of sole production rights under the original patents expired in the United States in 1909. But by that time the Aluminum Company of America, as it was now called, had developed such a powerful position in the industry that it resisted all challenges to this position until its monopoly was ended by Government action in 1945. Basic to its success in this regard was the consolidation, from fairly early in its life, of all stages of production in the industry within the embrace of its

corporate activity. Vertical integration, as we shall see, flowed not only out of the need to secure economies in the production of aluminium, but also out of the natural compulsion to preserve and enhance the original monopoly position of the firm in the United States aluminium industry.

Vertical Integration

One of the earliest forms of vertical integration for this firm was forwards, into fabrication. This was due to the fact that metal-users were ignorant of the applications of the new metal and the company itself had to demonstrate these by setting up its own fabrication plants.[8] Whereas forward integration into fabrication has remained a feature of the firm, it has never been total or near-total in the sense that the firm's production of aluminium has been fully or near-fully absorbed by its own fabricators.[9] One reason for this is the ease of entry into the fabricating industry, a consequence of the large number of fabricated products and the relatively small capital and technical resources needed to set up facilities to produce any one particular product. The fabricating industry, therefore, contains a large number of small firms. Another reason was the apparent tendency for rates of return to be lower on fabricating than on production proper,[10] in conjunction with the fact that since the

firm had a monopoly of primary production the incentive to integrate forward to assure itself of outlets for its own metal was reduced.

Horizontal and backward integration, however, was made virtually total from early in the life of the firm. That is to say, it came to acquire or itself construct facilities to supply itself with virtually all the electric power, the alumina and the bauxite required to support its production of primary aluminium.

Electric power is consumed in enormous quantities in the production of metal from alumina[11]- approximately 15 percent of the manufacturing cost, it was recently estimated, consists of electricity costs.[12] Smelting, therefore, requires an abundant and reliable supply of low-cost power. As early as about 1900 Alcoa, in recognition of the economic and strategic value of owning its own power, began an energetic programme of acquiring and constructing hydro-power facilities. In the first decade of the century hydro-power capacity or potential was developed or acquired at three sites in the United States and one (Shawinigan) in Canada. By far the most strategic acquisition was that of large-scale power facilities and potential along the Saguenay River in Canada, in 1924.[13] One consequence of this was the exclusion

of a potential competitor who had contemplated using the facilities for aluminium production. Although the company later officially denied knowledge of such plans, and thereby implicitly denied that it had intended to exclude competitive aluminium production by acquisition of these facilities, it already had, at the time, sufficient reserves of power to support the expansion of both domestic and foreign aluminium capacity.

Ownership of its own power gives Alcoa, and any aluminium producer, certain crucial economic advantages in the production of metal. Electricity can be obtained in reasonably regular and reliable supply at a lower cost than from existing electricity producers. The lower costs are due to at least three factors. For one thing, the capacity of the power plant can be related specifically to the requirements of the smelter, and the former can be operated at near-full capacity continuously. This eliminates the need for costly peak load facilities that most commercial users have to carry, as well as the higher costs of wide fluctuations in the proportions of capacity used. A second factor is that facilities for the conversion of alternating to direct current in the smelter may be eliminated as the power plant may incorporate direct current generators. Most critical of all, the company

can develop power sites in places of abundant low-cost power potential which are reasonably accessible to raw materials and markets, but which may not have been developed otherwise because of the absence of demand.[15]

In addition to direct cost advantages, own-account ownership and development of hydro-power potential had the strategic value of making it more difficult for potential competitors to enter the industry at all. This was particularly strong in the United States, where there is a scarcity of suitable sites for the development of the kind of power required by aluminium smelting. As Wallace points out:

> "A new aluminium enterprise would require cheap energy which was well located with respect to ore and markets. Unless power could be obtained which would enable a new firm to lay down aluminium in a given market at a cost, all things considered, which was not far above the cost to old producers of reaching that market with a metal made by developing a part of their power reserves, a new firm would not be able to enter the industry with a reasonable expectancy of profits." 16

By being first in the industry and by its foresighted and aggressive policy of acquiring the most obvious power sites from very early in its life, Alcoa not only secured reserves for its own long-term expansion, but also reduced the availability of suitable power potentials to possible competitors. In the 1920's the United States Department of Justice, concerned at monopolisation in the industry, cited as a reason the lack of suitable

power facilities for possible new entrants.[17] As we have already seen, this was one consequence of the company's acquisition of the enormous power potential of the Saguenay in the 1920's.

The other links in the chain of the company's integrated activities were those of alumina manufacture and bauxite mining. At the outset, the company imported alumina from Germany. But this was only a temporary measure lasting until Alcoa could secure the independence of its own supplies. Six years after its formation the company acquired bauxite deposits in Georgia, which was beneficiated for it by a chemical company. Soon after the turn of the century it acquired the far richer fields in Arkansas, and built an alumina plant in East St. Louis to carry out the beneficiation. Thus the company 'shifted terrain' from one raw material area to another within the metropole, a pattern which was to assume international proportions later in the life of the industry.

The Incorporation of the Caribbean

It was not very long before the company began to look abroad for other deposits to "engross". It was logical that, given the lack of large-scale deposits of bauxite within the United States, the company

would have to be on the hunt for overseas reserves to secure its supply position until well into the future. When, however, a party of Alcoa representatives arrived in then British Guiana in 1914 "to stay until all the workable deposits had been optioned or acquired for the Americans,"[18] it must have had more than the prospective needs of the company in mind. the fact that they wished to secure all the deposits rather than some specified quantity; and the fact that "through persistent litigation, negotiation, and compromise (the company) had acquired a very large proportion of the suitable bauxite of British Guiana by 1925"[19] suggests that there was the additional motive of excluding competitors from access to deposits.

In fact, the company did have competition for the known deposits of this Caribbean Hinterland country. (These deposits had been discovered and identified by the Government of the then Colony). At the very outset representatives of German capital had visited the colony together with the Alcoa officials to investigate its bauxite potential, but by arrangement between the firms and their local promoters the field was left entirely to Alcoa. Subsequently, between 1919 and 1923, a representative of the Uihlein family acquired ore deposits in the territory which were destined for use by the family firm in its bid to

enter the U.S. aluminium industry. Alcoa engaged in a bitter legal battle over ownership of these deposits; when this failed, the company simply bought out the Republic Carbon Company, the Uihlein firm which had planned to begin aluminium smelting in the United States and which owned the deposits in British Guiana. Thus, in one action, Alcoa disposed simultaneously of the threat to its monopoly aluminium position in the United States and its monopoly ore position in British Guiana.[20]

An almost identical sequence of events took place in neighbouring Surinam (Dutch Guiana). In the years after 1912 Alcoa secured control over most of the known bauxite deposits of that country. The Uihlein firm in the 1920's had also obtained an option on some Surinam deposits, and these were transferred to Alcoa when it purchased the Republic Carbon Company.

By the 1920's then, Alcoa had established a position not only of monopoly, but unchallenged preeminence in the U.S. aluminium industry. This was based on its original head start through appropriation of the technology of the industry and consolidated firmly by means of vertical integration. In this consolidation, Caribbean bauxite from the Guianas played an important part.

Vertical integration conferred two crucial advantages on the competitive ability of the firm, and its ability to grow over time as the market for its product expanded. One was in terms of direct cost economies, the other in terms of strategic control of much of the vital natural resources needed by competitors. Of the first, Wallace has said:

> ".... the decisive advantages of vertical control in the aluminium industry have been, and are, provision of the most economical power, neat adjustment of investment and output between the various stages - particularly adjustment to the steady capacity of the power plant - and an assurance of satisfactory quality in the materials for the reduction process. These gains are made possible by and require the use of special coordinating ability on the part of some managers. Evidently, a high degree of efficiency ordinarily requires as a minimum bringing under one managerial control the preparation of alumina, electrodes and furnace linings, the generation of energy, and the reduction operation. Under some conditions, ownership of bauxite enables some reduction in cost. Accumulation of reserves of ore and power sites has, of course, been occasioned in large part by considerations of tactical advantage." 21

And of the second, he concludes:

> "In conclusion, it does not seem that the almost complete lack of new firms in this industry in Europe and America since the (First World) War can be explained entirely by the acquisition of large ore reserves by the established firms; but it is evident that these acquisitions greatly enhanced the difficulty of the problem facing potential entrants.
> It is not clear whether the power problem of an independent venture in America or Europe could have been solved more easily than the problem of acquiring satisfactory ore." 22

The Multinationalisation of Operations
and The Formation of Aluminium Ltd.

The acquisition of bauxite reserves in the Guianas was only one aspect of the multinationalisation of Alcoa's activities which took place in the 1920 decade. In Section A we wrote of the metropolitan firm in mineral industry that:

> "... on the output side, it must become international inasmuch as the market is becoming international. As the product is traded between countries, the same necessities which gave rise to the extension of the firm from the local to the national level now compel it to become international - ultimately multinational. To secure control over export markets - the domestic markets of other nations in the metropolitan world - marketing, refining and production must be brought, so far as it is possible, within corporate frontiers."

In the European aluminium industry, this process took the form of national firms in France, Germany, Switzerland and Britain extending themselves into each other's domain. And there was at least one attempt by a European firm to cross the Atlantic and compete with Alcoa on its own home market, by vertical integration in the U.S. of smelting and power, with alumina supplies from its own plants in France.[23] Had the outbreak of War in 1914 not cut off the supply of finance from France, it seems likely that this attempt would have been successful. As it happens, these

exceptional conditions forced the French firm to withdraw in 1915, and in order to cut losses its partly constructed facilities were sold to Alcoa.

In the 1920's Alcoa began its own transatlantic crossing to secure power resources and smelting plant in Europe. Considerable interest was displayed in Norway, a country with enormous hydro-power potential. The company acquired interests in three aluminium companies based in Norway, all of which owned or had access to water power. One of these companies, in which Alcoa secured a fifty percent interest and a majority of directors, was already vertically integrated from bauxite in Surinam and France, alumina in France, and power, smelting and fabricating in Norway. Alcoa also purchased a French company with hydro-power capacity in the Pyrenes and an aluminium producer in Italy. At the same time the company was securing its exclusive interest in the enormous Saguenay potential. These activities clearly demonstrate the company's high assessment of the strategic value of power resources.

The initial multinationalisation of the Alcoa's activities, therefore, was accomplished in the space of few years. In 1928 it formed a new company, Aluminium Ltd., an act which was to change

the course of development of the industry and the way it affects the Caribbean.

Aluminium Ltd. was formed not as a subsidiary of Alcoa, but rather as a nominally independent company which took over ownership and management of most of Alcoa's foreign holdings. After the change the only non-U.S. holdings remaining in Alcoa's ownership were the Surinam bauxite operation and part of the Saguenay power facilities. Aluminium Ltd. was incorporated in Canada, it was legally separated from Alcoa and in 1936 it was said of it that "In corporate domicile, location of mines and plants, and in nationality of labour, Aluminium Ltd. is a British firm enjoying intro-Empire trade privileges." [24] In the 1930's representatives of both Aluminium Ltd and Alcoa testified in court that there was no common control exercised over the two firms. [25]

In spite of this, there are considerable grounds for concluding that Aluminium Ltd. was formed and functioned as an agent for the multinational strategy of Alcoa, or rather, of the aluminium interests which owned both companies. Inasmuch as the entire share ownership of Aluminium Ltd. was distributed between the shareholders of Alcoa in proportion to their holdings in the latter, the result was that four

shareholders owned the majority of the stock in both companies.[26] This situation whereby a small number of individuals controlled both companies prevailed right up until 1950, when a United States court ordered that it should be ended.[27] Up until that time Alcoa had continued to produce almost entirely for the United States domestic market, whereas Aluminium Ltd. had concentrated on servicing the markets of the British Empire and penetrating those of Western Europe. The companies therefore hardly competed with one another, but rather were the means whereby the owners of both continued to monopolise the aluminium industry of North America as well as participate significantly in the growth of the industry in Europe and the non-communist world.

For purposesof analysis, therefore, we shall regard Alcoa and Aluminium Ltd. as being two components of a single decision-making entity until the year 1950. The choice of that year is admittedly arbitrary, but it is the year when a Court order was issued for the two companies to be separated in ownership, and it does mark the beginning of a period which saw the emergence of market competition between them.

The U.S. Government and the End of Monopoly

In the 1930's Alcoa's position as the only domestic producer of aluminium attracted the attention of the United States Department of Justice, which formally charged the company with monopolisation under anti-trust legislation in 1937. An early decision in Alcoa's favour was reversed in 1945, when the charge against the company was upheld.

Rather than split the company into a number of smaller companies (as happened in the Standard Oil case) the U.S. Government was able to break the monopoly by the way in which it disposed of its own aluminium capacity which had been built during the Second World War. The Government agency responsible decided that the facilities should be disposed of in order to create vertically integrated competitors with Alcoa. A number of smelting and fabricating plants were involved, but the number of alumina plants - two - set the limit on the number of firms to which the facilities could be disposed. The firms selected were Reynolds Metals and Kaiser Aluminum and Chemicals. The disposition of the facilities was such that by 1948 Alcoa owned only slightly more than half the aluminium smelting capacity in the United States and Reynolds and Kaiser shared the other half between them. In 1950, therefore, a further court decision was able to avoid the recommendation

of dissolution of Alcoa, but did direct that the common ownership of Alcoa and Aluminium Ltd should end.[28]

It is important at this point to note the many ways in which Government policy not only affected the course of development of the organization of the aluminium industry, but also the way in which Government assistance, particularly during wartime, assisted its growth and that of the firms engaged in it.

During the Second World War both the U.S. and the U.K. Governments assisted the substantial expansion of aluminium capacity required for the war effort. In spite of the U.S. Government's anti-trust litigation against Alcoa, that company received accelerated depreciation allowances which enabled it to double its capacity and still accumulate substantial liquidity at the war's end. Reynolds was able to enter the aluminium industry through loans from the Government's Reconstruction Finance Corp. totalling U.S.$52 million for the construction of two aluminium smelters and an aluminium sheet factory. Kaiser operated Government-owned magnesium plants for the Government and was thereby able to press its case for ownership of the Government aluminium plants after the war. Aluminium Ltd obtained long-term loans from the U.K.

Government for most of its expansion, and advance payments for aluminium from the U.S. Government.[29]

After the War, the terms on which the U.S. Government disposed of its aluminium facilities to Reynolds and Kaiser were extremely liberal. Facilities which had cost U.S.$174 million to construct were sold to Reynolds for $57.6 million; Kaiser obtained for $43.5 million facilities which had cost $127 million. In both cases the current replacement costs of the facilities were greater than the original construction cost.

During the Korean War, all three of the major American companies received assistance for the doubling of the country's aluminium and alumina capacity. This took the form of accelerated (five year) depreciation allowances and a Government guarantee to purchase all unsold metal produced by the new plants in their first five years of operation.[30] The effect of this was not only to considerably reduce the risk involved in the expansion of capacity, but also to permit high rates of return in the industry as well as a considerable capacity for self-financed interest-free expansion.

The U.S. companies' sales and therefore production of both aluminium and bauxite were greatly stimulated by U.S. Government purchases of both commodities in the 1950 decade, and particularly between 1950 and 1957. Government purchases of aluminium were for the purpose of meeting current military requirements, for the strategic stockpile, and to fulfill the market guarantees given the producers for the expansion of capacity between 1951 and 1954. The total of these purchases apparently ran at an annual average of 500,000 tons, upwards of one-third of total primary aluminium production of the U.S. industry.[31] Stockpile purchases were also made of "Jamaica-type" bauxite (from Jamaica, The Dominican Republic and Haiti) and "Surinam-type" bauxite (from Surinam and British Guiana). At the end of 1963 approximately 8 million tons of each type had been accumulated,[32] representing 17 percent and 13 percent each of the total bauxite shipped from these two groups of Caribbean countries in the 1950-1963 period.

Finally, when the companies sought to extend and complete their vertical integration into the stage of bauxite mining, Government assistance was provided. As it happens, this involved a further incorporation of Caribbean bauxite into the North America aluminium industry.

Reynolds had acquired a mining subsidiary in Arkansas in the U.S. after the war, and had in fact become the largest domestic producer of ore in 1950. Its vertical integration for existing metal capacity was therefore complete, but for the growth of capacity envisaged for the Korean War effort substantial new bauxite supplies. This was provided to a large extent by bauxite drawn from deposits which were acquired in Jamaica, British Guiana and Haiti, particularly the first of these three. Reynolds' initial investment in mining and associated facilities in Jamaica of U.S. $14.5 million was largely covered by a loan from "Marshall Plan" funds in 1950; $7.3 million was loaned in U.S. dollars and £1.8 million in sterling. In the same year Aluminium Ltd received a loan from the same source of $2.5 million in U.S. dollars and £1.5 million in sterling as part financing of the construction of bauxite mining and alumina manufacture facilities in Jamaica. Both loans were repayable in the form of deliveries of aluminium ingot to the U.S. Government stockpile.[33]

Thus, by the early 1950's, the basic pattern of the post-war development of the North American aluminium industry had been set. Four large independent companies now existed. Each was vertically integrated from bauxite mining to aluminium smelting, with varying

degrees of further integration into power and into fabricating. And in each, Caribbean bauxite not only played a strategic role in their current operations, but also in their massive expansion over the next seventeen years.

Alcoa, it will be recalled, had retained the Surinam bauxite operation when it transferred most of its foreign properties to Aluminium Ltd in 1928. By the 1950's, it was drawing the bulk of its ore from Surinam mines and the remainder from mines in the United States. To these sources were added the Dominican Republic in the early, and Jamaica in the late 1950's. Aluminium Ltd had inherited from Alcoa the British Guiana bauxite subsidiary, the Demerara Bauxite Company. In the 1950's it set up a major bauxite/alumina operation in Jamaica as well. Kaiser set up a very large mining operation in Jamaica, from which it supplies all its ore requirements for its United States production. Reynolds, as already indicated, draws ore from subsidiaries in Jamaica, British Guiana and Haiti, as well as the United States. By 1964 the four companies were supplying approximately nine-tenths of their raw material needs for their North American operations from Caribbean sources.

Table 4 shows the structure of vertical integration based on Caribbean bauxite for that year. The columns show the four companies, the rows show the location of their vertically integrated operations, starting with Caribbean bauxite and ending with fabricating in North America. The Table also gives some financial information on the companies and indicates the extent of their operations outside of the American Hemisphere.

In more detailed fashion Figure 1 shows the number, location, capacity, and ownership of the specific alumina and aluminium plants which are fed with Caribbean bauxite. This figure applies to the U.S. companies only.

FIGURE I

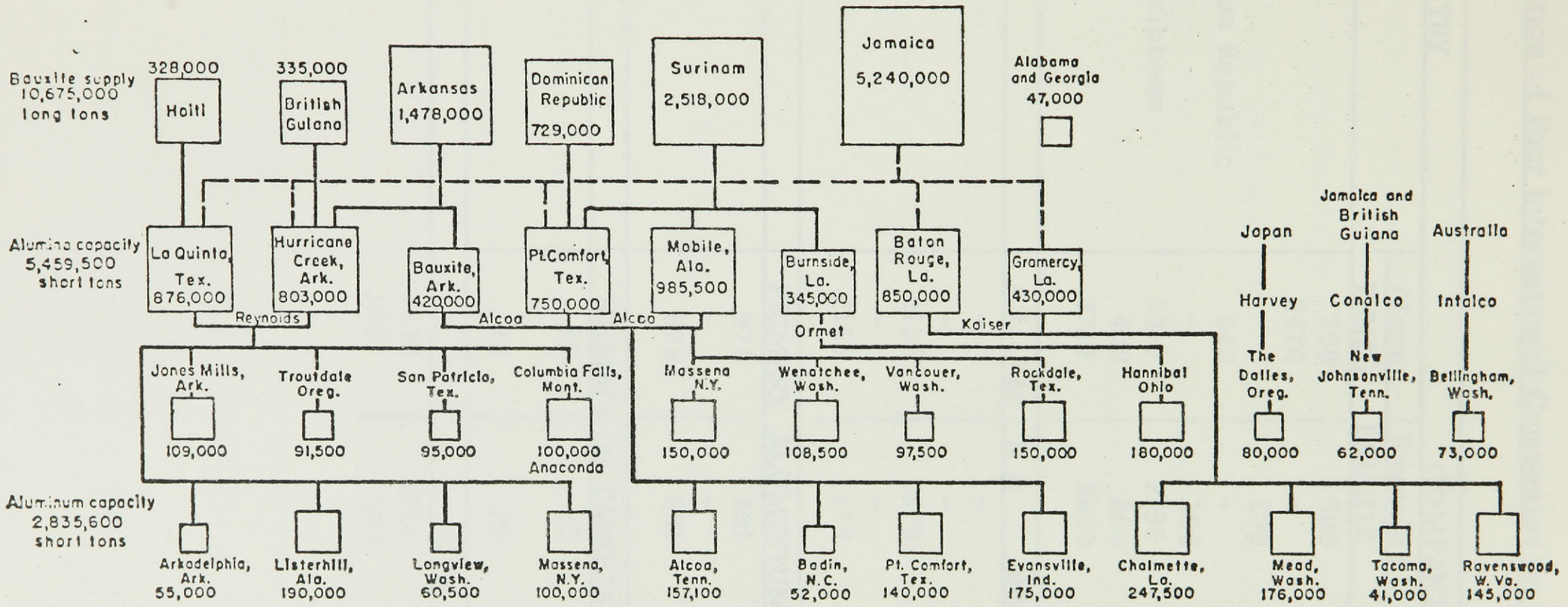


FIGURE 1.—Bauxite Supply and Alumina- and Aluminum-Plant Capacities in the United States in 1963 (Includes Plants Under Construction).

Source: U.S. Bureau of Mines. Mineral Facts and Problems, 1965.

TABLE 4

rtical Integration of Four International Companies on Caribbean Bauxite, 1964

SS AND COUNTRY	COMPANY AND PRODUCT			
	Alcoa	Reynolds	Kaiser	Aluminium Ltd.
	DRIED BAUXITE 000 LONG TONS			
ean: Jamaica	200	1600	4200	1800
Surinam	2470	-	-	-
Guyana	-	200	-	2300
Dominican Republic	640	-	-	-
Haiti	-	396	-	-
Total Caribbean	3310	2196	4200	4100
States	400	600	-	-
lining	3710	2800	4200	4100
iation	ALUMINA 000 SHORT TONS			
ean: Jamaica	-	-	-	932
Guyana	-	-	-	370
States [1]	2155	1679	1230	-
[1]	-	-	-	1270
eneficiation	2155	1679	1230	2572
g	PRIMARY ALUMINIUM: 000 SHORT TONS			
States	878	691	599	-
	-	-	-	740
melting	878	691	599	740
ting	NUMBER OF FABRICATING PLANTS			
States	26	22	22	12
				3
abricating	26	22	22	15
al Data [2]	$ MILLIONS [3]			
	1630	1028	917	1512
es	1037	625	516	662
after Tax	76	37	29	57
% Own Capital	16.3	15.6	19.6	20.1
INTERNATIONAL OPERATIONS				
	DRIED BAUXITE: 000 LONG TONS CAPACITY			
		-		500
ia		-		600
ia & Latin America	200-300	-	N/A	60
iation	ALUMINA 000 SHORT TONS CAPACITY			
		118		27
ia		-	44	358
ia & Latin America	230	-	56	632
g	ALUMINIUM 000 SHORT TONS CAPACITY			
	N/A		-	97
ia			115	192
ia & Latin America	30	20	-	16
ting	NUMBER OF COUNTRIES			
	1	5	4	11
o-Asia	2	3	4	6
stralia & Latin America	1	1	1	8

URCES: U.S. Bureau of Mines: Minerals Yearbook 1964
1964 Annual Reports of Alcoa, Kaiser Aluminium and Chemical Corp., Reynolds Metals Co., and Aluminium Ltd.
I.M.F. Steel and Aluminium Workers' Conference: Aluminium Industry Throughout the World.

2. Output Determination by Company

In Section A, we pointed out that the level of output, the growth of output, and the degree of elaboration of the mineral resource industry in the Caribbean are the result of company decisions. Here, we show how this process has taken place in the history of the behaviour in the Caribbean of the four major North American aluminium producers. Each company will be examined in turn and, so far as the available data permit, its decisions regarding the location of its raw material requirements and of the processing of the material will be examined.[34]

(a) Alcoa and Aluminium Ltd., 1917-1950

The establishment and early growth of the Aluminum Company of America was based on domestic bauxite. Nonetheless, the company was from early in its life looking for foreign reserves of the ore and, as already recounted, began acquiring bauxite in British Guiana from 1913. An initial capital investment of five million dollars was made over the next few years for mining, crushing, and drying, port and transport facilities. Production began in 1917. In neighbouring Surinam, similar facilities were established in the post-war period, and production began in 1922.

Table 5. Aluminum Company of America and Aluminium Limited. Estimated Production of Primary Aluminium and Source of Bauxite Supplies. 1916-1950

ar	Aluminium Production - 000 metric tons			Source of Bauxite Supplies - 000 Long Dry Tons -				
	Alcoa	Al. Ltd.	Total	Total	U.S.A.	British Guiana	Surinam	Indonesia
16	52	8	60	425	425			
17	59	12	71	751	569	2	-	-
18	57	15	72	610	606	4	-	-
19	58	15	73	379	377	2	-	-
20	63	12	75	552	521	31	-	-
21	25	8	33	152	140	12	-	-
22	33	8	43	329	310	-	19	
23	58	10	68	639	523	100	16	
25	63	15	78	584	321	177	86	
26	67	18	85	700	442	209	49	
27	74	36	110	560	271	136	153	
28	95	36	131	725	362	160	203	
29	103	31	134	806	389	197	220	
30	104	34	138	740	344	125	271	
31	80	31	111	484	193	123	168	
32	48	18	66	300	102	66	132	
33	39	16	55	300	158	37	105	
34	34	15	49	316	166	50	100	
35	54	21	75	468	246	111	111	
36				740	357	160	217	
37				1160	440	311	400	
38				1551	311	376	371	493
39				1312	355	451	477	29
50	352	373	725	n/a	n/a	1462	1578	

Percentages

Year	Total	U.S.A.	British Guiana	Surinam	Indonesia
1916	100	100	-	-	-
1917	100	99	1	-	-
1918	100	99	1	-	-
1919	100	99	1	-	-
1920	100	94	6	-	-
1921	100	92	8	-	-
1922	100	94	-	6	-
1923	100	82	16	2	
1925	100	55	30	15	
1926	100	63	30	7	
1927	100	48	24	27	
1928	100	50	22	28	
1929	100	48	24	28	
1930	100	46	17	37	
1931	100	40	25	35	
1932	100	34	22	44	
1933	100	53	12	35	
1934	100	53	16	32	
1935	100	52	24	34	
1936	100	48	22	30	
1937	100	38	27	25	
1938	100	20	24	24	32
1939	100	27	34	36	3

Production in both British Guiana and Surinam climbed very quickly relative to the company's output of bauxite in the United States. By 1925, the bauxite drawn from domestic mines had declined to fifty-five percent of the total; in 1927 it was exceeded for the first time by ore drawn from the Caribbean.

Table Five gives the available estimates for production by the company for the period 1916-1950.[35] (The output of Aluminium Ltd., which owned the British Guiana subsidiary from 1928, is consolidated with that of Alcoa to give an overall picture of the operations of the two companies.) It shows that the bauxite drawn from the Caribbean grew over time and by 1939 the two countries were supplying over seventy percent of the total input requirements.

Table Six uses index numbers to show how production in the bauxite sources changed between 1925 and 1939 as aluminium production of Alcoa and Aluminium Ltd. changed. Together with table five, it shows the pronounced trend for incremental input needs to be drawn from the Caribbean while bauxite drawn from domestic mines is kept at a relatively stable level. The greater relative increase shown for Surinam, as compared with British Guiana, over the period was due to the fact that

the output of the former in the base year was much smaller than that of the latter. In fact, after the violent fluctuations of the depression years, output in both Caribbean countries was brought to roughly the same level and grew at approximatlely the same rate.

During the Second World War, production in the North American aluminium industry grew substantially, in large part through the construction and operation of alumina and smelting capacity by the U. S. Government. Output of bauxite in the United States and in the Guianas was expanded rapidly to fill the derived raw material needs.

TABLE 6

ALUMINIUM PRODUCTION BY ALCOA AND ALUMINIUM LTD. AND BAUXITE PRODUCTION IN THE U.S.A., BRITISH GUIANA, AND SURINAM, 1930-1950. (1925=100)

Year	Aluminium	Bauxite			
		Total	U.S.A.	British Guiana	Surinam
1930	176	127	107	71	315
1935	95	80	77	63	129
1939	249	225	111	254	555
1950	929	n/a	n/a	826	1834

After the War, production of both aluminium and bauxite declined but by 1950 production was beginning to grow again under the stimulus of civilian demand as well as the accel eration of the arms race, and the outbreak of the Korean War. By this, the terminal year in the joint analysis of Alcoa and Aluminium Ltd., bauxite from the Guianas was supplying approximately eighty-five percent of the companies' requirements. The level drawn from each country was then about 1,500,000 long dry tons - showing a remarkable tendency for the companies to share their incremental bauxite requirements equally between the two sources, and to maintain a level of output in each which was to all intents and purposes the same.

Up to 1950, therefore, the main factors in output-determination so far as they affect the Caribbean can be summed up as follows. Consumption of aluminium in the United States was the largest in any single market, and was growing by the largest absolute amounts. This demand was satisfied almost exclusively by the Aluminum Company of America and Aluminium Ltd. of Canada, which were commonly owned and probably commonly controlled. These two companies began drawing bauxite from the Guianas from the end of the First World War. They continually substituted supplies from these sources for United States

bauxite in the satisfaction of their incremental raw material needs. The secular trend was for ore drawn from the U.S. to be maintained at approximately the same level from 1916 onwards and for incremental needs to be supplied equally from the two Guianas. Thus, from the early 1920's, the secular trend for Caribbean bauxite production followed that of consumption in the United States and production by Alcoa and Aluminium Ltd.

(b) Alcoa: 1950-1965

After 1950, we examine Alcoa separately from Aluminium Ltd. and regard each as a distinct decision-making entity. The former company in 1950 had a production of primary aluminium of 350,000 short tons, giving rise to a bauxite requirement of just over 1,400,000 long dry tons. Bauxite was drawn from two company-owned sources; in Surinam, and in the United States. Output of bauxite in Surinam at this time was about 1,600,000 long dry tons and in the United States between 400,000 and 600,000 tons. This means that the Caribbean country supplied about seventy-five percent of the company's raw material production; but total ore production by the company was considerably in excess of the needs of its own metal production. At this time, Alcoa was selling bauxite to Kaiser, who had no sources of

bauxite of its own. This company's aluminium production of 143,000 tons required bauxite inputs of about 560,000 tons, which was just about the volume of 'surplus' tonnage of Alcoa.

With the outbreak of the Korean War, Alcoa was allocated 205,000 tons of assisted new smelter capacity by the U.S. Government. In 1955, with this capacity completed, the company initiated a further round of expansions to capacity which was to add almost 150,000 tons by the end of 1957. The bulk of this company's post-war expansion was concentrated in this period. Further improvements and additions brought total smelter capacity up to over 900,000 tons in 1965.

Table seven shows that Alcoa's share of U.S. primary aluminium production fell from forty-nine percent in 1950 to thirty-five percent in 1965. This was the result of the growth in the shares of Kaiser and Reynolds, influenced largely by the actions of the United States Government. Alcoa's share of U.S. production thus shrunk from total monopolisation in 1939 to about one-third in 1965.

ALCOA: SOURCE OF BAUXITE REQUIREMENTS, 1950 - 1965

BAUXITE PRODUCTION METAL GRADE - 000 LONG DRY TONS

	Aluminium Production (U.S.A.)	Per Cent of U.S. Production	Alumina Capacity (U.S.A.)	Surinam	Dominican Republic	Jamaica	U.S.A.	Total Bauxite
1950	352	49	701	1,578	-	-		
1951			701	2,148	-	-		
1952			1,107	2,527	-	-		
1953			1,606	2,469	-	-		
1954			1,606	2,731	-	-		
1955				2,413	-	-		
1956				2,851	-	-	644	
1957				2,722	-	-	456	
1958					-	-	411	
1959			1,780	2,672	397	-	800	
1960			1,780	2,485	629	-		
1961			1,780	2,441	699	-		
1962					704	-		
1963					759		800	
1964	878			2,470	746	200		
1965	965	35	2,200		925	716		

Note: Blank spaces indicate not available

Over the period, the increase in the company's aluminium output of just over 600,000 tons gave rise to an incremental derived bauxite demand of over 2,400,000 tons. The allocation of these incremental input requirements between different raw material sources was an important factor in output-determination for different Caribbean countries, and yields certain insights into the process of decision-making for the MNC.

In fact, during the 1950-1965 period, Alcoa established mining capacity in other Caribbean countries, and supplied about two-thirds of its incremental needs from them. About one-third only was supplied from its Surinam operation. After rising by over sixty percent between 1950 and 1952 only, the output of metal-grade bauxite by Alcoa in Surinam hardly changed over the next thirteen years. Thus, Surinam experienced a falling share in the input requirements of a company whose share of the end-product market was itself falling. At the same time, the actions of the company resulted in the establishment of a bauxite industry in the Dominican Republic, and the addition of output to Jamaica. This is yet another example of the company "shifting terrain", in the language of Pure Plantation Economy.

Alcoa had apparently secured access to deposits in the Dominican Republic in 1945. The installation of facilities for mining, crushing and drying, and shipping, began in 1948 but was not completed until 1958. An annual capacity of one million tons of dried ore was involved, and production climbed slowly towards this total between 1959 and 1965.

In Jamaica, the company did not appear on the scene until the middle 1950's. A possible reason for this is the fact that Aluminium Ltd. had begun prospecting, and began to acquire deposits in Jamaica from 1943. On the evidence, new foreign sources of ore were being divided equally between Aluminium Ltd. (Jamaica) and Alcoa (The Dominican Republic) so that the pace of diversification of supply sources was the same for both companies.

In fact, when Alcoa began to acquire deposits in Jamaica, this was the first time that both companies were using the same Caribbean country as a source of bauxite. This may be one piece of evidence that common control over the two companies had effectively ceased.

As it happened, Alcoa was too late on the scene in Jamaica to acquire a substantial amount of reservesof ore. Capacity equal to the operation in the Dominican Republic - one million tons per annum - was established between 1959 and 1963, with production and exports to the mother company beginning in 1964. Reserves held by the company in both countries were estimated at between forty and sixty million tons, while reserves in Surinam were probably between one hundred and fifty and two hundred million.

A number of reasons may be inferred for the company's diversification of supply sources and allocation of incremental raw material output in the post-1950 period. It is likely, to begin with, that cost factors were at work. As deposits were progressively depleted in the United States and in Surinam, lower-grade ores had to be mined in the former, and greater 'overburden' thicknesses had to be "stripped" from the ore bodies in the latter. Compared to United States bauxite, the deposits in both Dominican Republic and Jamaica are of a higher grade; compared to Surinam bauxite, they are covered by a far thinner 'overburden', and the shipping distance to alumina plants in the United States is far smaller.

Cost considerations could not have been the only or even the prime factors at work, however. In fact, the cost of bauxite mining represents an extremely small proportion of the total costs of aluminium smelting - according to one estimate, three percent only.[36] This is particularly so where the producer is vertically integrated and does not pay a market price for the ore or for the shipment of the ore from mine to alumina plant. It is likely that Alcoa was more concerned with continuing to assure itself of reserves for long-term expansion, to diversify its geo-political supply sources and to continue the general strategy of "engrossing" as many deposits as possible in order to reduce the potential supply to competitors.

At the end of the Second World War, Alcoa's raw material position had certain weaknesses. Its U.S. reserves getting smaller, the lower quality and increasing depths of the available deposits made mining and benefication more costly. In the absence of any other sources, this meant that incremental needs would have to be met from Surinam, This entailed the risks of dependence on one Hinterland country likely to be vulnerable to the political and economic nationalism then sweeping the Third World. Being a Dutch colony, Surinam belonged politically to a different Metropole, albeit one within the Western sphere

of influence. More important, Surinam was seeking and obtaining a greater degree of political autonomy from Holland, and could be expected to ask for "Independence" in the not too distant future. Perhaps most important of all, the Government of Surinam began to revise the arrangements for the taxing of Alcoa soon after the War, in order to enlarge the tax take and to end the company's exploitation of its previous freedom to set the price on its own bauxite sales to itself. These changes culminated in an overall agreement between the Government and the company in 1958.

In this context, the acquisition of reserves and the establishment of mining capacity in the Dominican Republic in the 1945-1958 period served a long-term, a medium-term, and a short-term end. In the long-term, it was an addition to the company's reserves for secular expansion. In the medium-term, it would serve as an insurance against the disruption or dislocation of supplies from Surinam. And in the short-term, it could be used for purposes of bargaining with the Surinam Government for a tax agreement that was not too "unfavourable" to the company.

These conclusions are reinforced by the behaviour of the company when a threat to one of its supply sources came in 1960, not from Surinam, but from the Dominican Republic itself. After the attempt in which the Dominican President Trujillo was implicated on the life of the Venezuelan President, the United States broke off diplomatic relations with the Trujillo regime, and instituted some economic sanctions against the Republic. In the ensuing anti-American campaign, the Government of the Republic singled out Alcoa as a target for public attacks, claiming that the company had undervalued its sales for tax purposes, and threatening expropriation. In the same year, Alcoa expedited the installation of mining facilities in Jamaica, completing in four years a capacity which had taken ten years to establish in the Dominican Republic. This was at a time when the aluminium market was depressed, and the company was under no immediate pressures in respect of its bauxite supply position - save those arising out of its difficulties with the Dominican Government. In 1960 too, the company acquired substantial deposits in Australia. It is possible to conclude that the Jamaican operation functioned as a form of reinsurance on the Dominican Republic operation, while the reserves in Australia are an insurance on the Caribbean area as a whole.

Thus, the company has not only "shifted terrain" from country to country within the Caribbean, but also shifted to outside of the Caribbean, considerably broadening the range of its supply options.

Processing and the "Muscovado Bias"

Under vertical integration, the output of bauxite in the Caribbean is institutionally linked to the production facilities of the MNC's. Whether further elaboration of bauxite into alumina and aluminium took place within British Guiana and Surinam depended on the decisions of Alcoa and Aluminium Ltd. Since the intermediate goods demanded, and the value added, increase substantially at the alumina and aluminium stages, these decisions have an important effect on the rate and pattern of economic development in the Hinterland.

We shall see that in the aluminium industry, until very recently, there existed a very pronounced pattern for the bulk of the benefication, smelting and fabricating stages to be carried out within the Metropoles in which the MNC's are based. The "Muscovado Bias" of Pure Plantation Economy has been reproduced. Many of the reasons for this are common to all the companies and were discussed in Section A. In this Section, we shall examine the specific factors

which influenced these decisions for each particular company.

For Alcoa, the incorporation of Caribbean bauxite into its supply network was, in effect, an extension of a production complex which was originally based on domestic resources. The pattern of vertical integration had emerged by the second decade of the century, when the Caribbean deposits were acquired. An alumina plant had been built in East St. Louis, and smelting and hydro-power capacity had been established in the U.S.A. and Canada.

For this company, therefore, the hypothetical options open to it as regards the processing of Caribbean bauxite were as follows:

(i) Build an alumina plant in one of the Guianas, for the bauxite production of both; or in each of the Guianas for the bauxite production of each, with hydro-power and smelting expanded in North America to process the alumina.

(ii) Alumina facilities in either or both of the Guianas, with hydro-power and smelting in either or both to process the alumina.

(iii) Alumina, hydro-power and smelting expanded in North America to process ore shipped from the Caribbean.

As it happened, the third option was chosen, and alumina, power and smelting capacity in the Metropole were simply expanded to accomodate inputs of Caribbean bauxite. Both economic and strategic factors must have contributed to this.

On the economic side were the cost advantages of economies of scale. These apply particularly to alumina and power facilities, and arise both out of the capital costs of expansion and of current operation. Up to a certain point, the capital costs of expanding existing alumina plant for the required additional capacity are less than the costs of building a new plant of the same capacity. The market for aluminium in the 1920's was so uncertain as to have made it difficult for any producer to plan on the basis of any reliable estimate for the growth of aluminium sales, and therefore derived alumina requirements. This would have been a precondition for the justification of the construction of a new alumina plant in the expectation that it could achieve high levels of output, and therefore economies of scale in operational costs, in the foreseeable future.

By expanding the existing alumina plant, the company achieved capital cost savings in the expansion of capacity, operational costs savings through economies of scale, and minimised the risk in the expansion of its capacity.

More or less identical factors would have operated in influencing the decision to expand existing hydro-power facilities rather than to develop potentials in British Guiana or Surinam. The factors would apply with even greater force in this stage, since both capital and operational economies of scale are very important in hydro-power facilities. Moreover, the company had, by 1925, secured the enormous resources of the Saguenay river, with power potential sufficient to support the expansion of smelting operations for decades into the future.

Cost factors, however, may not be sufficient to explain why, when a new alumina plant was built in 1928, it was located beside the smelter in Canada rather than beside the bauxite mines in British Guiana which were to feed it. This plant was built by Aluminium Ltd. beside its new smelter at Arvida, on the St. Lawrence. Its ore requirements were drawn principally from the Demerara Bauxite

Company, the British Guiana subsidiary which had been transferred to Aluminium Ltd. when that company was incorporated out of Alcoa's foreign properties.

The options thus open to Alcoa/Aluminium Ltd. were, therefore, quite simple: to locate the new plan to process British Guiana bauxite in Canada or in British Guiana. Since a new plant was to be built in any case, the question of expanding an existing plant did not arise. In favour of siting the new plant in British Guiana would have been the cost savings of shipping alumina, which is forty-five percent the weight of bauxite per aluminium content, rather than the dried ore.

That the plant was built in Canada notwithstanding, was probably due to strategic factors. For one thing, although the plant was to be fed mainly with bauxite from B.G., the company probably wished to maintain flexibility with respect to the sources from which the bauxite was supplied. In fact, bauxite from Surinam and from the United States was used, at times, to supply the plant. The input mix could, therefore, be adjusted according to changes in costs, physical production, and transport conditions, fiscal and

commercial regimes, and so on. Had the plant been located in British Guiana, it would have been difficult to retain this flexibility. For this would have meant that, at times, the company would be shipping bauxite from the United States and Surinam for processing to British Guiana. Bauxite would have to be hauled from within the interior of the United States to the Gulf Ports, and then shipped to B.G. and finally sent upriver to the plant. Ore from Surinam would first be sent down the Surinam river to the Caribbean, then along the coast and up the IDemerara River to the plant. The difficulties of doing this arise not out of any limitations in the technology of transport, but in the nature of the transport infrastructure laid down by the companies. This infrastructure was specific to two-way links between each Hinterland and its Metropole with virtually no links at all between Hinterlands. Commodity movements between different Hinterlands, even within the same company, are thereby inhibited.

Moreover, for bauxite to be imported for processing in British Guiana, which itself is a bauxite producer, would have continually exposed the company to charges from the public and the Government that production of ore within the country was suffering thereby. In

fact, the company was subjected to considerable pressure from the British Guiana Government at the start of its operations for the establishment of alumina facilities. The terms of its concession included a proviso that an alumina plant to process British Guiana bauxite should be built on British soil. Many Guianese understood this to mean that processing would take place locally, but the construction of the plant in Canada fulfilled the literal conditions of the contract.

Thus, the second alumina plant built by Alcoa/Aluminium Ltd., which was fed almost entirely by Caribbean bauxite, continued the pattern for the Hinterland to be relegated to the production of crude ore and the Metropole to carry out the elaboration. The "Muscovado Bias" continued.

The pattern was further reinforced by decisions to build alumina plants which were to be fed with Caribbean ore at Mobile, Alabama in 1936-38, and Point Comfort, Texas, in 1956-58. A plant was also built near to the company's mines in Arkansas in 1950-52, but this was to be, in effect, a replacement of the original East St. Louis plant which was built in 1903 and which

became obsolete in 1956. Whereas, the location of the Arkansas plant (at a town appropriately named "Bauxite") reflected the intention to base it on domestic ore, the location of the plants in Alabama and Texas on the Gulf Coast reflected the fact that they were designed for ores shipped across the Caribbean. The plant in Alabama, which was completed just before the Second World War, was designed to meet the prospective growth of imports from Surinam; the one in Texas completed in 1958 was complementary to the new capacity for ore production completed in the Dominican Republic in the same year.

It was not until the 1960's that Alcoa began to locate incremental alumina and smelting capacity within the Caribbean Hinterland. The countries concerned are Surinam and Jamaica. The reasons for the change are pressure from Caribbean Governments, marketing strategy, and planning decisions permitted by the high rate of growth of demand.

In the 1950's, the Government of Surinam began protracted negotiations with Alcoa. The issue was the terms of collaboration between the bauxite industry and the national economy. The

Government was concerned about the unfavourable tax arrangements and the general paucity of tax revenues, and the fact that little elaboration of the country's chief natural resource took place locally. As part of a new overall agreement on pricing, taxation, and new concessions, the company agreed to build a hydro-electric works and a smelter with an annual capacity for 60,000 metric tons.

To Alcoa, the smelter would serve two main purposes. Since Surinam is an associate of the E.E.C., the aluminium would have duty-free access to that market. The smelter would thus become an element in the company's European marketing strategy. The second, and possibly more important purpose, was that its establishment was part of a seventy-five year "package deal" which won for Alcoa continued and expanded access to Surinam's bauxite, and a tax arrangement which served its objectives of minimising the total tax payments to Hinterland and Metropolitan Governments.

The agreement also included a proviso that Alcoa should build an alumina plant. The plant, which was completed in 1965, has a capacity of 800,000 metric tons and is, therefore, well in excess of the capacity required by the smelter. In part, this is due

to the agreement for Alcoa to process bauxite for Billiton, a minor producer in Surinam. Billiton will dispose of the alumina produced from its own bauxite. For the remainder, it seems likely that the company will export alumina to its own smelters in the United States which were, at the time, being expanded.

In the middle 1960's, the Government of Jamaica, also concerned about the low degree of elaboration of Jamaican bauxite locally, concluded a series of agreements with five U.S. companies for the construction of three new alumina plants. One of these involved Alcoa, which agreed to build a plant with an initial capacity of 200,000 tons per annum, and an ultimate capacity of 800,000 tons, subject to the availability of bauxite.

One reason why the firm can now afford to agree to build two alumina plants of such large capacities so soon after each other is the high rate of growth of demand. If Alcoa's domestic primary aluminium output grows at an annual average of six percent, the minimum rate projected for the U.S. industry, as a whole, in the second half of the 1960 decade, then the average annual absolute increase in metal output will be of the order of 60,000 tons. This

requires an annual average increase in alumina capacity of 120,000 tons. With new plants being built for ultimate capacities of 800,000 tons, this means that the company may have to plan on a new plant once every seven years. This gives it much greater flexibility with respect to the location of new plants. This greater flexibility, in turn, means that the company can use the location of alumina plants as an instrument for bargaining with Hinterland Governments for access to Hinterland bauxite,and for agreeable tax arrangements.

Output-Determination: (c) Aluminium Ltd.
1950-1965

In 1950, when it was ordered that the ownership of Aluminium Ltd. be separated from Alcoa, the former company was already fully vertically integrated. Hydro-electric and smelting facilities at Shawinigan and Arvida in Quebec had been transferred from Alcoa; new facilities were constructed on the Saguenay in 1943 to meet the war-induced expansion. A single alumina plant, at Arvida, fed all three smelters. The Arivda plant was fed mainly by ore from the Demerara Bauxite Company in British Guiana.

In 1950, the company's output of aluminium was 360,000 tons. Alumina output, therefore, must have been about 700,000 tons and bauxite requirements about 1,400,000 tons. In that year, Aluminium Ltd.'s bauxite output in British Guiana was 1,462,000 tons, suggesting that all its ore requirements were drawn from that source and that virtually all the output of the Demerara Bauxite Company was fed into the parent company's Metropolitan facilities.

Table eight indicates the course of development of Aluminium Ltd.'s primary aluminium output and its changing input mix over the period. The main features were these. The company embarked on a massive programme of hydro-electric development and expansion of smelting capacity in Canada. It also built and acquired smelting facilities in a number of countries outside of North America. To fill its incremental input requirements, the company developed a large alumina operation in Jamaica, and a smaller one in Guyana, (formerly British Guiana). Calcined bauxite (not used for aluminium production) came to be produced on a large scale in Guyana. In this process Jamaica became the major producer of raw material for the company's alumium operations. Guyana became a minor raw material producer for its aluminium operations and the only producer for its growing calcined bauxite operation.

TABLE 8

ALUMINIUM LIMITED
SOURCES OF BAUXITE AND ALUMINA

	Jamaica	- GUYANA -		- ALUMINIUM OUTPUT -		
	Alumina	Alumina	Bauxite	Canada	R-O-W*	Total
1950	-	-	1,462	360		
1951	-	-	1,841	406		
1952	112	-	2,114	453		
1953	33	-	2,014	495		
1954	139	-	1,917	561		
1955	215	-	1,975	608		
1956	238	-	1,911	620		
1957	488	-	1,704	557	99	656
1958	418	-		600	115	715
1959	468	-	1,074	503	155	658
1960	730	-		672	190	862
1961	771	134	914	569	171	740
1962	734	247	1,032	596	194	790
1963	792	248	682	626	214	840
1964	836	327	536	740	244	984
1965	834	308	881	728	269	997
				788	286	1,074

*i.e. in the Rest of The World. This column refers to aluminium produced by companies to which Aluminium Ltd. is affiliated.

Note: Blank spaces indicate not available.

The company had begun prospecting for bauxite in Jamaica since 1943. Like Alcoa, who began prospecting in the neighbouring Dominican Republic around the same time, the company must have been impelled by the need to continue to expand its ore reserves and to broaden its geo-political supply/sources. In fact, large reserves of bauxite were discovered, and acquired, in central Jamaica.

By comparison with Guyanese bauxite, the Jamaican deposits have certain decided advantages to Aluminium Ltd. and, in fact, to all the North American companies. To begin with, although Jamaican bauxite is lower in alumina content, it is also lower in Silica content, than Guyanese ore. Since silica inhibits the recovery of alumina in the "Bayer" process of beneficiation, the disadvantage of the one is to a great extent compensated by the advantage of the other. In fact, Aluminium Ltd., and the other two companies which began mining in Jamaica in the 1950's, designed a modification of the standard "Bayer" process to treat bauxite of the specific chemical composition of that found in Jamaica and Hispaniola (so-called "Jamaica-type" bauxite). These bauxites, which are low-silica and high-iron, differ from "Surinam-type" bauxite found in Surinam, Guyana, and the United States. The result of the low-silica content of "Jamaica-type" bauxite

and the modification of the standard beneficiation process was that the recovery of alumina per ton of ore was not significantly lower than that for "Surinam-type" bauxite.

The clear advantages of the Jamaican deposits arise out of their large size and the absence of thick "overburden" (non-bauxitic earth) on the ore. This meant that mining costs would be significantly lower than in Guyana, where the ore bodies contain smaller tonnages, and overburden running into hundreds of feet thick have to be stripped before the removal of the bauxite can begin. Estimates of the per ton costs of mining in Jamaica in the late 1950's put them at approximately thirty-three percent lower than in Guyana: about 1.25 pounds compared to 1.85 pounds.

The clearest evidence of Aluminium Ltd.'s intention to base a large part of its incremental aluminium production on Jamaican raw material came in 1950 when it decided to construct a huge hydro-electric-smelter complex in British Columbia specifically for alumina to be produced in Jamaica. Since Guyanese bauxite was shipped to the older Arvida plant, which was not to undergo significant expansion, Guyanese output was, in effect, to be stabilised.

NB

The place selected for the hydro-power-smelter complex was at Kitimat, British Columbia. In "the largest industrial, financial, and engineering project ever undertaken in Canada by private enterprise"[37] the company crea ted a three hundred and fifty-eight square mile reservoir, drilled a ten-mile tunnel through rock to install a power-house inside a mountain with a planned capacity of 896,000 KW, associated with a smelter with a present capacity of 290,000 tons. The project, which created a modern town of ten thousand people out of a wilderness, had cost the company Can. four hundred and fifty million dollars up to 1966.

The construction of an alumina plant in Jamaica - the so-called "Kirkvine Works" - was an integral part of the complex. In fact, when this plant reached a capacity of 500,000 tons in 1956, it was supplying more than the full needs of the Kitimat smelter, whose capacity at that time required only about 360,000 tons of alumina.

The remaining portion of the output of Kirkvine was used to service other smelters within Canada, which were being expanded in the early 1950's.

By 1956, the company had taken the decision to build two other alumina plants in the Caribbean - one more in Jamaica and one in Guyana. There were a number of factors which must have contributed to this decision. The first was the substantial expansion programme in hydro and smelter capacity which the company was completing in Canada. Projects planned or underway at this time involved an expansion of 240,000 tons of primary smelting capacity and of power sufficient to support an expansion of over 350,000 tons of metal. The projected new alumina plants, with a total capacity of 490,000 tons, were roughly in accordance with this expansion. The expansion of Jamaican capacity took the form of building a new plant, rather than expanding the Kirkvine Works, because the latter had not been designed for a much larger capacity. The new plant in Guyana was probably associated with the company's intention to retain Guyana as a source of raw material and, given this, to exploit the transport economies of weight-reduction arising out of processing bauxite at the source of the ore.

In the latter part of the 1950 decade, marketing difficulties affected both the U.S. companies and Aluminium Ltd. In addition to the recession in the demand for aluminium which took place in the United

States and the non-communist world as a whole at this time, the company experienced stiff competition in its traditional markets from the U.S. companies themselves. Thus, the parent company's wholly-owned aluminium production in Canada did not experience a secular increase over the period from 1954 through 1962. Although the construction of the two new alumina plants was deferred for a year as a result of the slow-down in Canadian smelter production, they were completed in 1960 (Jamaica) and 1961 (Guyana) and production began. This was possible because Aluminium Ltd.'s affiliates, particularly those in Norway and Sweden, purchased alumina from the company under barter contracts in which aluminium ingot was supplied in return. Thus, the international connections of Aluminium Limited gave Jamaican and Guyanese alumina, through the channels of the MNC, access to a wide number of export outlets. Because of this, the output of Caribbean alumina was not tied exclusively to the input requirements of Canadian smelters; and Caribbean alumina exports were more than doubled between 1955 and 1962 in spite of the lack of growth of the company's Canadian smelter output.

After 1962, the company began to enjoy the beneficial effects of the high rate of growth of aluminium consumption. Over the next three years, smelter capacity in Canada was brought into full utilization,

and deferred expansion plans were restarted. Alumina capacity in the Caribbean came into full utilization. In 1965 and 1966, the company announced plans for the expansion of alumina capacity in Jamaica to the extent of 350,000 tons. This is associated with the expansion of smelter capacity both in Canada and by affiliates in Scandinavia and Asia. It confirms the shift, which had emerged since the War, towards Jamaica as the chief Caribbean supplier of the company's needs. At the same time, the company is engaged in the development of alumina capacity in Australia to meet the alumina needs of its affiliated Asian smelters.

Thus, Jamaica became a major exporter of alumina. Yet, although there was a shift from Guyana to Jamaica as the major Caribbean source of the company's material requirements for metal, important changes were taking place in the structure of Guyanese output which had the effect of raising its total value. For while the <u>total</u> of dried bauxite output by the company in Guyana did not grow significantly, there was a substantial growth of the high-valued calcined bauxite and alumina exports, at the expense of exports of unprocessed bauxite. In effect, what took place was the diversion of a substantial part of bauxite output, from exports to local processing. This was brought about by the large

expansion in calcined bauxite capacity and the construction of the alumina plant. The low-silica bauxite of Jamaica does not appear to be suitable for calcining, so that Jamaica does not "compete" with Guyana in this product. The net effect of these structural changes was that Guyana became the minor supplier of Aluminium Ltd. in alumina and the major supplier in calcined bauxite, the demand for which has been growing rapidly.

Aluminium Ltd. and the "Muscovado Bias"

The behaviour of Aluminium Ltd. in the early post-war period with respect to the location of bauxite-processing has differed slightly from that of the U.S. companies. For, whereas the latter did not decide to locate alumina plants in the Caribbean Hinterland until the 1960's, Aluminium Ltd. opted to do so from the early 1950's. By 1962, the company was operating three alumina plants in the region with combined capacities of over one million tons, supplying about half of its alumina needs.

The principal reason for this is probably that the geographic spread of this company's production facilities involves far greater distances, so that the economies of weight-reduction in shipping alumina rather

than bauxite becomes more important. Canadian smelters are located on the St. Lawrence, in the Saguenay region, and at Kitimat on the Pacific coast. Affiliated smelters are in Norway, Sweden, Japan, and India. Alumina is also occasionally sold to customers in the E.E.C.

Had the company satisfied its incremental needs by exporting bauxite from Jamaica and Guyana without further processing, its increased transport costs can be illustrated by the following example. Suppose the alumina plant for the Kitimat smelter had been located at Kitimat itself rather than in Jamaica. Then bauxite would be shipped through the Panama Canal, and up the Pacific coast. After processing, the alumina which is surplus to the needs of Kitimat, would then have to be shipped through the Panama Canal again and across the Atlantic to Norway and Sweden. By producing alumina in Jamaica and exporting part to Kitimat and part to Scandinavia, transport costs would be sharply reduced through the lighter weight of the material shipped from Jamaica to Kitimat, and the elimination of the loading, distance and Canal costs of shipping alumina from Kitimat to the North Sea.

For the U.S. companies, shipping involved the short and relatively simple route of Caribbean ports on the Gulf Coast, where the alumina plants are located. Transport savings in shipping alumina instead of bauxite would not be as significant. Moreover, certain strategic considerations arising out of the Korean War and affecting the U.S. companies, did not apply to Aluminium Ltd.

Aluminium Ltd., however, decided to continue to locate its hydro-power-smelting operations outside of the Caribbean Hinterland. It is true that at the end of the War the company had underdeveloped power resources in the Saguenay, which could be expected to absorb its expansion for some time to come. But the Kitimat development was in an area where the company had no interests prior to 1948. Since it is reasonably certain that hydro-potential does exist in Guyana, it is worth asking why the company opted to locate its major new development at Kitimat rather than at the locus of bauxite deposits in the Caribbean Hinterland.

Partly, this must have been due to the particular advantage of Kitimat, which offered in the same place a huge hydro-potential, together with direct access to the sea. The Guyanese power potentials

are all located deep within that country's interior. This would have entailed the construction of costly transport facilities from the interior to the sea; a development which was not required at Kitimat.

Another factor would have been the company's decision to draw the alumina for the new smelter from a plant in Jamaica, where mining costs are low. It would clearly have been well-nigh politically impossible to feed a smelter in Guyana with alumina produced in Jamaica. A smelter in Guyana would, in effect, have committed the company to base its incremental raw material output there, instead of in Jamaica. Apart from the disadvantages this would have entailed in the form of higher bauxite mining costs, it would have increased the company's dependence on a single major source of raw material, with the concomittant risks.

Finally, the question of risks would also have arisen from the point of view of the political risks of of four hundred and fifty million dollar investment in a Hinterland country. This investment represented some twenty-two percent of the undepreciated value of the company's fixed assets in 1966. That these risks were real in the industry in the post-War period was demonstrated by Indonesia's expropriation of the

Dutch bauxite company, Billiton, in the early 1950's, and Aluminium Ltd.'s own losses when the Government of Guinea expropriated a subsidiary of the company in that country in 1961.

Output Determination (d) Reynolds Metals

Reynolds, it will be recalled, entered the U.S. aluminium industry during the Second World War by managing Government-owned aluminium plants. At the War's end a part of the Government's aluminium facilities was disposed of to this company. This included smelters, an alumina plant, and bauxite mines in Arkansas.

Like the other companies, Reynolds had to secure new reserves of bauxite for its post-War expansion. After 1945, the company acquired substantial deposits in Jamaica. Production began there in 1953. A subsidiary was acquired in Guyana in 1952, and one established in Haiti around the same time, with production beginning there in 1957. In spite of the availability of ore from three other sources, Reynolds supplied the bulk of its incremental requirements from its Jamaican mines. Table nine shows that between 1951 and 1965 the company's production grew from 215,000 to 740,000 tons of aluminium, giving rise to bauxite requirements of about 3,000,000 tons. Two-thirds of these requirements were supplied by Jamaica in that

TABLE 9

REYNOLDS: SOURCE OF BAUXITE
- REYNOLDS METALS -

BAUXITE 000 LONG DRY TONS

	Jamaica	Guyana	Haiti	U.S.A.	Total Bauxite	Alumina Capacity	Aluminium Production	Per Cent U.S. Production
1951	-	-				465	259	31
1952	-	-						
1953	611	58				1,095		
1954	1,018	145				1,095	401	
1955	933	213					429	
1956	955	244		1,100	2,257		427	
1957	1,309	307	318	960	2,894		466	
1958	1,937	154	317	900	3,189	1,277	493	
1959	1,824	158	307	900	2,978	1,460	545	
1960	1,576	224	268				494	
1961	1,769	326	263			1,606	446	
1962		441	370				536	
1963		296	327				604	
1964		308	373				691	
1965	2,000	434	320			1,679	740	27

Note: Blank spaces indicate not available.

year. The remainder was supplied about equally by Haiti, Guyana, and the United States.

The acquisition and expansion of Reynold's aluminium and alumina capacity during this period took place in four phases. (i) Immediately after the World War, (ii) during the Korean War, primarily for military purposes, (iii) in the 1954-58 period, to meet anticipated increases in civilian consumption, and (iv) in the 1963 and after period, to meet both the recovery of the aluminium market and the increased requirements of military needs associated with the Vietnam War.

Bauxite output in Jamaica was clearly related to the expansion during the Korean War by the fact that the new alumina plant, built in Texas with a capacity of 569,000 tons, was designed to use the "modified" Bayer process developed for Jamaica - type bauxite. In effect, this limited the feed of the alumina plant to bauxite drawn from Jamaica and Haiti. But since Reynolds had far more reserves in the former country, it was logical that output there would be far higher. In fact, in 1957, the first year of production in Haiti, it was reported that output could only be sustained by U.S. Government

TABLE 10

PERCENT DISTRIBUTION OF REYNOLDS BAUXITE RESERVES, 1958

Jamaica	50
Guyana	25
Arkansas	15
Haiti	10

stockpiling of the ore. In 1965, the level of production was hardly above the 1957 level. This meant that, as the Texas alumina plant was expanded over the period, the incremental feed came from Jamaica.

In 1955, Reynolds embarked on a further round of capacity expansion. To provide for the growing needs of its smelters, alumina capacity was expanded in both the Texas and Arkansas plants. Thus, bauxite from Guyana and the United States, as well as from Jamaica, could have been expected to share in the expansion. Bauxite drawn from Guyana did, in fact, increase from 200,000 to 400,000 tons between 1955 and 1965, but most of the incremental requirements came from Jamaica.

In spite of the fact that Reynolds had twenty-five percent of its reserves in Guyana, it was drawing, in 1965, only about fourteen percent of its bauxite from that source. It is true that Guyanese bauxite could only be processed in the alumina plant in Arkansas, but, if the ratio of Guyanese to Arkansas bauxite used in this plant was the same as the ratio of reserves of the former to the latter,,

then Guyanese bauxite would have supplied sixty-two percent of the needs of this plant. As it happened, in 1965 it was supplying only twenty-five percent of the plant's total capacity. Moreover, Guyanese bauxite then being mined was of a higher quality, and probably cheaper to mine, than Arkansas bauxite. That the share of the latter in the feed of this plant was far greater, in proportion to reserves, than that of the former, was probably due to two factors. One was the great advantage that Arkansas bauxite had by virtue of the fact that the alumina plant was located at the same site, while Guyanese bauxite was three thousand miles away, and involved land, river, and sea transport. The other was the fact that the Government of Guyana was controlled, from 1953 to 1964, by the Marxist-oriented Government of Dr. Cheddi Jagan, which claimed to be hostile to foreign capital.

In 1965, Reynolds embarked on another round of expansions of its aluminium capacity. Once more, incremental raw materials are to be drawn mainly from Jamaica. Mining capacity there is to be expanded to over four million tons by 1970. At the same time, the company is a partner with Kaiser and Anaconda in a consortium, which is building a 950,000 ton capacity alumina plant to be completed in 1969.

Thus, part of Reynolds' incremental needs will be satisfied by bauxite drawn from Jamaica and processed in domestic alumina plants, part by alumina produced in Jamaica, and fed directly into the company's domestic smelters.

Output-Determination (e)
Kaiser Aluminum & Chemicals

Kaiser is the only one of the four majors which relies exclusively on one source - Jamaica - for its domestic aluminium production. The company's aluminium production grew from 140,000 tons to over 600,000 tons, giving rise to a total derived bauxite demand of about 2,400,000 long dry tons. Table eleven shows that bauxite output of Kaiser's Jamaican subsidiary, all of which is shipped to the parent in the U.S.A., grew to a total of over 4,000,000 tons in 1965. It therefore seems that Kaiser sells a significant part of its Jamaican output to other smaller companies with no independent sources of ore. These companies - Anaconda, Consolidated Aluminum, Harvey, Ormet and Intalco - supplied about fifteen percent of U.S. output in 1965 and have a combined aluminium capacity of 434,000 tons. This would give rise to a bauxite requirement of about 1.6 mn. tons: the same quantity as Kaiser's "surplus tonnage".

The growth of Kaiser's output in Jamaica was clearly related to the expansion of capacity and output in its processing facilities in the United States. The initial prospecting and exploring activities in Jamaica immediately after the War were associated with the acquisition of alumina facilities from the U.S. Government in Louisiana. This plant was expanded with Government assistance as part of the Korean War effort between 1951 and 1953, to a total annual capacity of 850,000 short tons. Establishment of mining capacity in Jamaica for two million (wet) tons of bauxite per annum was directly related to this alumina plant, whose expansion in turn was related to the construction of 223,000 tons new aluminium capacity.

In 1954, Kaiser, as well as all the other companies, embarked on a new round of capacity expansion to meet the growth of civilian demand for aluminium. A smelter with an ultimate designed capacity of 220,000 tons aluminium was to be built in Virginia. This was to be fed by a new alumina plant built in Louisiana with a capacity of 430,000 tons per annum. As a result, bauxite capacity in Jamaica was expanded to 3.6 million (wet) tons.

TABLE 11

KAISER: SOURCE OF BAUXITE — 000 TONS

	Jamaica Bauxite	Alumina Capacity (U.S.A.)	Aluminium Production (U.S.A.)	Percent U.S. Production
1950	-	393	143	20
1951	-			
1952	-			
1953	514	780		
1954	1,007	800		
1955	1,284			
1956	1,662			
1957	2,398		417	
1958	2,952	850	442	
1959	2,604	1,280	489	
1960	2,599		488	
1961	3,164	1,280	461	
1962			600	
1963			580	
1964	4,200		599	
1965		1,550	625	23

Note: Blank spaces indicate not available.

In the latter part of 1950, aluminium markets did not prove as buoyant as the companies had anticipated: a recession in demand in 1957 and 1959 levelled off production before it had caught up with capacity, and depressed prices. Kaiser's Jamaican output up to 1958 was maintained with the help of U.S. Government stockpiling of Jamaican bauxite and the invoking of the market guarantees for the output of the new aluminium capacity awarded by the Government. Output in 1959 and 1960 fell, however, and did not reach capacity until 1961.

Since that time, there has been a sustained recovery in the aluminium market with U.S. apparent consumption of the metal growing by over twelve percent per annum. Kaiser's smelters eventually reached full capacity in 1964 and in 1965 were expanded for an additional 50,000 tons annual production. An addition to the second Louisiana alumina plant was associated with this and gave rise to new bauxite requirements. Once more, this was satisfied from the Jamaican mines, where capacity was raised to six million tons per annum. In 1966, Kaiser announced participation in a new alumina plant to be built in Jamaica in consort with Reynolds and Anaconda.

Reynolds, Kaiser and the "Muscovado Bias"

The decision by Reynolds and Kaiser in 1966 to construct, together with Anaconda, a large alumina plant in Jamaica, marked the first time that either of these two companies was to locate beneficiation in the Caribbean Hinterland. Although by far the bulk of the massive expansion of both these companies after 1950 was based on Caribbean bauxite, the ore was elaborated in domestic alumina plants, and in smelters owned by these vertically integrated firms. Like Alcoa and Aluminium Ltd., the "Muscovado Bias" has operated strongly for these firms, with the result that the overwhelming majority of the value added in the first three or four stages of the industry has accrued to the metropole.

For Reynolds and Kaiser, the decision that the early post-War growth of beneficiation would take place within the metropole was virtually determined by the sale of an alumina plant to each of these firms by the U.S. Government. Since these plants were obtained at only a fraction of their current replacement cost, there could be no question of building new plants, either in the United States or in the Caribbean.

New plants were, however, built during the expansion required by the Korean War in the 1950-54 period. Both Reynolds and Kaiser built plants designed specifically for Jamaican bauxite, on the Gulf Coast, where the bauxite could be unloaded from ore carriers coming from Jamaica, and railed directly to the plants. In this case, the option of building plants in the United States was clearly chosen in preference to that of building plants in Jamaica.

In the case of Reynolds, it is arguable that there was the need to maintain flexibility of the input mix by source, since the company also planned to draw bauxite from Haiti for its new plant. But this did not hold for Kaiser, which relied exclusively on Jamaican bauxite.

There was the fact that alumina imported into the United States was dutiable, whereas bauxite is not. From 1954 onwards the duty was suspended in two-yearly intervals, although the companies might not have anticipated this at the time their locational decisions were taken in 1950. However, one estimate suggests that in the middle 1950's, it would have been cheaper to manufacture alumina within Jamaica and deliver it to the Gulf Coast smelters, inclusive of duty, than to ship

dried bauxite to the Gulf Coast and manufacture alumina there.

Perhaps the critical factor determining the locational decisions was considerations of strategy - by the U.S. Government as well as by the companies. It should be borne in mind that these plants were built specifically for Korean War needs and at a time of considerable international tension stemming from the Cold War. The companies, in an important sense, were acting as agents of the United States Government's programme for the expansion of the aluminium industry. Accelerated depreciation allowances were provided for both the new smelting and alumina capacity, and generous market guarantees were given for the new aluminium output. Financial assistance was provided Reynolds and Aluminium Ltd. to set up capacity in Jamaica, partly because

> " ... the Gulf Coast ports are only about 1,000 miles from Jamaica, compared to 2,500 miles from the Guianas, and the sea-route to Jamaica can be effectively patrolled by land-based aircraft."
> U.S. Bureau of Mines, Minerals Yearbook. 1950. Chapter on Bauxite.

It seems likely that the U.S. Government, under these conditions, would have had an interest in retaining a maximum degree of processing

within the territorial borders of the country. This would have been necessary to maximise the protection of strategic plant and to minimise the value of strategic material transported by sea. And, under the circumstances, the Government would have been in a strong position to have its wishes followed, as in an important sense, it was through its instrumentality that the plants were being built at all.

During the 1950's and early 1960's, the four plants owned by Reynolds and Kaiser were expanded gradually to meet smelter requirements. This must have yielded economies of scale, both in capital and operational costs. By the middle 1960's, however, the plants must have been nearing the limits of their expansion.

The arrangement by Kaiser, Reynolds, and Anaconda to build a new, large plant in Jamaica had a number of advantages to all three companies. Part of the incremental alumina needs of all three companies could be met, probably at a lower cost than from existing alumina plants, because of the savings in transport costs, and because the economies of scale could be enjoyed since each company had a part share in the output of the large-scale plant. (Had each company built its own plant to produce an amount equal to its share in the single plant, then there

would have been three smaller plants with higher costs.)

Also, the pressures which had been building up within Jamaica for a greater degree of bauxite-processing could be relieved, thereby helping to ensure continued access to the rich Jamaican deposits. Finally, since a consortium is involved, the political risks are shared amongst three companies rather than one, while the cost advantages of a large-scale plant may be enjoyed.

Output-Determination: (f) Main Features

The main influence of the growth of Caribbean bauxite has been the continuous process of North American MNCs drawing their incremental bauxite needs from the Caribbean since 1917. Up to 1950 this growth was shared equally between Surinam and Guyana. After 1950 and up to the present time, Jamaica substituted incrementally for the two Guianas.

Table six shows that between 1917 and 1950, the proportion of the bauxite requirements of Alcoa and Aluminium Ltd. satisfied by Caribbean ore grew from zero to seventy percent. Table twelve shows that between 1950 and 1965, the proportion of total United States bauxite

supplies originating in the Caribbean grew from fifty-two to eighty-six percent. Canada, since 1917, has relied directly or indirectly almost exclusively on Caribbean bauxite or alumina.

U.S. PRODUCTION AND IMPORTS OF BAUXITE 1950-65
000 LONG DRY TONS

	U.S. Production	From: Caribbean Total	From: Jamaica	Surinam	Guyana	Dominican Republic	Haiti
1951	1,849	2,446	-	2,319	127	-	-
1953	1,580	4,376	1,176	3,098	102		
1956	1,744	5,640	2,573	2,798	269		
1959	1,700	8,472	4,220	3,078	160	759	255
1962	1,369	10,579	6,010	2,853	560	719	437
1965	1,654	10,957	6,602	2,962	87	976	330

PERCENT TOTAL OF U.S. BAUXITE SUPPLY
U.S. IMPORTS

	U.S. Production	Caribbean Total	Jamaica	Surinam	Guyana	Dominican Republic	Haiti
1951	39	52	-	49	3	-	-
1953	26	73	20	52	2	-	-
1956	23	74	35	38	4		
1959	17	83	42	31	2	8	3
1962	11	89	50	24	4	6	4
1965	14	86	51	23	1	7	2

3. Caribbean Bauxite and Economic Growth

(a) Caribbean bauxite and the growth of the MNCs.

The foregoing analysis demonstrates that Caribbean bauxite was by far the major contributor to the growth of the four MNCs which control the North American aluminium industry, and much of that of the world outside. For Aluminium Ltd. and for Kaiser Aluminum, the dependence on Caribbean supplies has been virtually complete. Alcoa and Reynolds have retained domestic sources of ore, but by far the bulk of incremental growth of the former since 1917 and the latter since 1953, has been based on Caribbean material.

Table thirteen indicates the extend of Alcoa's growth for the periods before and after the incorporation of Caribbean bauxite into its supply network.

Over the period which started with mining in the Guianas in 1917, Alcoa evolved into a billion-dollar corporation, with Gross Revenues and Total Assets in 1965 of U.S. $. 1.2 bbl. and $ 1.7 bbl. respectively. The company lists one hundred and sixty-one production facilities in all, forty-two in foreign countries.

TABLE 13

DATA ON THE GROWTH OF THE ALUMINUM COMPANY OF AMERICA, 1909-1965,

		1909	1917	1965
Aluminium Production: 000 Tons		11	78	965
Gross Revenues: Million Dollars	(U.S.)	N/A	N/A	1171
Total Assets	"	25	86	1743
Net Income	"	4	14	76

Source: Wallace, op. cit. p. 570, and Alcoa Annual Report, 1965

TABLE 14

NUMBER AND LOCATION OF ALCOA'S PRODUCTION FACILITIES, 1965

	Domestic	Foreign	Total
Raw Materials	4	6	10
Refining	3	2	5
Smelting	8	4	12
Fabricating	25	14	39
Sales Offices	74	16	90
Research Laboratories	8	-	8
	119	42	161

Sources: Wallace, op. cit. p. 570, and Alcoa Annual Report, 1965

Table fifteen shows that between 1937 and 1966, Aluminium Ltd. also evolved into a billion-dollar corporation. Its total assets in 1966 were valued at over Can. $ 2. bbl. and revenues at just under Can. $ 1 bbl. In that year the company listed seventy-eight subsidiaries in thirty-nine countries. Of these subsidiaries, sixty-one were over fifty percent owned, nine were fifty percent owned and eight less than fifty percent owned.

Reynolds' growth during the Second World War was serviced in part by purchases of Surinam and Guyanese ore. After 1953, this company's expansion was based almost exclusively on Caribbean bauxite. The company joined the ranks of billion-dollar corporations in 1963, and lists operations in eighteen different foreign countries.

Kaiser Aluminum based all of its expansion after 1952 on Caribbean bauxite. Over the period from May 31, 1955 to December 31, 1964, the company's total assets grew by 146 percent and its net sales by ninety-two percent, and it now lists seventeen foreign, in addition to its forty-five domestic, operations.

The availability of Caribbean bauxite has,therefore,facilitated

TABLE 15

ALCAN ALUMINIUM LTD: DATA ON GROWTH, 1937-1966

	1937	1966*
Aluminium Production: 000 Tons	71	1074
Sales and Operating Revenues: Million Dollars (Can.)	49	998
Total Assets before Reserves: Million Dollars (Can.)	98	2643
Net Income Before Depreciation: Million Dollars (Can.)	11	161

* Includes Aluminium production of consolidated subsidiaries.

Sources: Alcan Aluminium Ltd; Annual Report, 1966.
Huggins, OP. cit. pp. 235.

TABLE 16

DATA ON THE GROWTH OF REYNOLDS METALS CO., 1941 - 1965

	1941	1956	1965
Aluminium Production: 000 Tons	8	427	740
Net Sales & Other Revenues: Million Dollars (U.S.)	49	409	747
Total Assets "	60	613	1174
Net Income "	3	41	53

Source: Reynolds Metals: Annual Report, 1965.

TABLE 17

NUMBER AND LOCATION OF REYNOLDS PRODUCTION FACILITIES, 1965

	Domestic	Foreign	Total
Mining	1	4	5
Alumina	2	-	2
Smelting	7	-	7
Fabricating	25	14	39
Research	5	-	5
Total	40	18	58

Source: As for Table 16.

TABLE 18

DATA ON THE GROWTH OF KAISER ALUMINUM AND CHEMICALS, 1955 TO 1964.

	Year Ending May 31, 1955	Year Ending December 31, 1964
Aluminium Production: 000 Tons.	428	650
Net Sales: Million Dollars (U.S.)	268	516
Total Assets "	372	917
Net Income "	29	29

Source: Kaiser Aluminum and Chemicals: Annual Report, 1964

TABLE 19

NUMBER AND LOCATION OF KAISER'S PRODUCTION FACILITIES, 1964

	Domestic	Foreign	Total
Raw Materials	4	2	6
Alumina	2	1	3
Smelting	4	3	7
Fabricating	22	11	33
Refractories and Chemicals	13	-	13
Total	45	17	62

Source: As for Table 18.

TABLE 20

FINANCIAL COMPARISON OF CARIBBEAN WITH CORPORATE ECONOMIES, 1964

	JE Millions	Year
Caribbean Bauxite Producers:		
Jamaica: Gross National Product	275	
Guyana: Gross Domestic Product	62	
Haiti: Gross National Product	125	1962
Dominican Republic: Gross Domestic Product	266	
Surinam: Gross Domestic Product	43	1963
Total	771	
North American Aluminium Corporations:		
(1) Total Assets		
Alcoa	582	
Aluminium Ltd.	760	
Reynolds	367	
Kaiser	327	
Total	2036	
(2) Gross Revenues or Sales		
Alcoa	370	
Aluminium Ltd.	243	
Reynolds	221	
Kaiser	184	
Total	1018	

*Note: Millions of Jamaican pounds at the exchange rate of U.S. $ 2,80 and Can. $ 3.0 to the 1 JE prevailing in 1964.

a process by which these corporations have attained substantial financial status and a wide spread of multinational operations. The size of these MNCs, in fact, compares favourably with the sizes of the Caribbean economies from which they draw over ninety percent of their bauxite requirements. The total of the sales of these corporations in 1964, for example, was one and one-third times the combined Gross Products of the Caribbean bauxite producers in that year.

(b) The "Muscovado Bias" and Value Added in the Metropole.

The factors which contributed to elaboration of the bulk of output of Caribbean bauxite within the metropole have already been discussed. As Table Twenty-one shows, since 1950, there has been a very slow fall in the proportion of bauxite exported without any processing other than drying. In the last year for which complete information is available, that proportion was still as high as seventy-nine percent.

The elaboration of Caribbean bauxite within Canada and the United States has given rise to considerable income and external economies. Tables twenty-two and twenty-three show an estimate that

the Gross Domestic Product created outside of the Caribbean (principally in North America) in the beneficiation, smelting and fabrication of its own bauxite, was J£ six hundred and ninety-one million in 1964, and the demand for intermediate inputs J£ four hundred and twenty-four million. These were respectively fifteen times and twenty-four times the estimated G.D.P. and intermediate inputs demanded within the Caribbean economies in mining and treating their bauxite.

The incomes and intermediate demands created directly moreover, do not account for the external economies to which the industry has given rise. One of the most important of these has been the stimulus to the development of the power industry of North America, particularly the hydro-power industry of Canada. As a result of the power needs of aluminium smelting, large power potentials have been developed in the Saguenay region of Canada. The excess power made available to non-aluminium users has contributed significantly to the economic development of the region. Power developed at Kitimat has also been made available to non-aluminium users.

TABLE 21

PER CENT CARIBBEAN BAUXITE PRODUCTION EXPORTED AFTER DRYING ONLY, 1950-65

	JAMAICA	SURINAM	GUYANA	DOMINICAN REPUBLIC	HAITI	TOTAL
1950	-	100				
1951	-	100				
1952	-	100	82			
1953	96	99	69			85
1954	83	96	83			89
1955	83		79			
1956	82	96	72			85
1957	79	97	79		100	96
1958	84	98	74		100	97
1959	80	97	74	100	100	84
1960	73		72	100	100	
1961	75	96	52	100	100	78
1962	79	94	48	100	100	79
1963	76		31	100	100	
1964	77		24	100	100	
1965	80		48	100	100	

TABLE 22

LOCATION OF G.D.P. CREATED BY PROCESSING OF CARIBBEAN METAL-GRADE BAUXITE, 1964
(£J MILLIONS AND $WI MILLIONS)

G.D.P. Created by:	Mining		Beneficiation		Smelting		Semi-fabricating		Total		
	£M	$ M	£ M	$ M	£ M	$ M	£ M	$ M	£ M	$ M	%
G.D.P. created in											
Caribbean	32	154	12	57	-	-	-	-	43	211	6
North America and Rest of World	-	-	43	206	204	979	401	1,925	648	3,110	94
Total	32	154	55	263	204	979	401	1,925	691	3,317	100

Sources: Calculated from data in U.S. Bureau of the Census. Census of Manufactures, 1963; and from data on Caribbean producers. Excludes estimate of value added and Input Demand generated by calcined bauxite produced within the area and from its bauxite exported.

TABLE 23

LOCATION OF INPUT[a] DEMAND GENERATED BY PROCESSING OF METAL-GRADE BAUXITE, 1964

Inputs Demanded by:-	Mining		Beneficiation		Smelting		Semi-fabricating		Total		
	£M	$M	£M	$M	£M	$M	£M	$M	£M	$M	%
Inputs demanded in:											
Caribbean	9	43	8	38	-	-	-	-	17	82	4
North America and Rest of World	-	-	29	139	136	653	242	1,162	407	1,954	96
Total	9	43	37	178	136	653	242	1,162	424	2,036	100

[a] Excluding inputs of bauxite, alumina and aluminium to beneficiation, smelting and semi-fabricating.

Sources: Calculated from data in U.S. Bureau of the Census. Census of Manufactures, 1963; and from data on Caribbean producers. Excludes estimate of value added and Input Demand generated by calcined bauxite produced within the area and from its bauxite exported.

In the United States, hydro-power sites have been scarce, and the aluminium industry has competed with other industries for power, rather than helped to make it available, as in Canada. In the 1950's, however, the industry provided a stimulus to the commercial utilization of natural gas as a source of cheap power on the Gulf Coast.

In the United States, aluminium has yielded substantial external economies by providing an input to the electrical, transport and building material industries. As such, it has often been lower in price and superior in some respects to older metals such as copper and steel. The metal has also been of considerable strategic value to the United States in two World Wars from which that country and its allies emerged victorious, and in a predominant position in world economic and political affairs.

(d) The Role of Bauxite in Caribbean Economies.

In what follows we shall discuss briefly the growth of output for each country over time, the degree of elaboration, and the Gross Value of output. Then, in a case study of one of the countries - Jamaica - we discuss some aspects of the direct contribution of the bauxite industry to economic growth.

The basic data on the production and value of the bauxite - based industry in the region since 1950 are provided in Tables Twenty-four to thirty. Table six gives production figures for Guyana and Surinam from the start of operations up to the beginning of the Second World War.

Guyana.

From the early 1920's right up until 1950, Alcoa/Aluminium Ltd. shared the growth of its bauxite requirements more or less equally between Guyana and Surinam, substituting ore from these sources for ore from the United States in incremental supplies. Guyanese output, therefore, followed the level of output in the North American aluminium industry fairly closely. Thus, in the depression years of the 1930's, production reached as low as twenty percent of its 1926 level. In the late 1930's, production picked up and grew substantially during the war years. Output, which had increased fourteenfold between 1920 and 1939, increased four and one-half times between 1939 and 1950. In the latter year Guyana was the world's second largest producer of bauxite.

TABLE 24

CARIBBEAN BAUXITE PRODUCTION BY COUNTRY AND COMPANY, 1950-65*
000' LONG DRY TONS.

	Caribbean Total	Caribbean Percent World Output	- SURINAM - Billiton	Alcoa	Total	- GUYANA - Aluminium Limited	Reynolds	Total
1950	3690	45	503	1578	2081	1462		1609
1951	4706	45	489	2182	2671	1841		2035
1952	5942	47	585	2588	3173	2114		2388
1953	7132	53	700	2523	3223	2014	58	2755
1954	7663	48	492	2817	3309	2165	145	2310
1955	8154	47	512	2567	3074	2222	213	2435
1956	9052	49	585	2845	3430	2237	244	2481
1957	10432	52	812	2512	3324	1895	307	2202
1958	10529	51	520	2421	2941	1432	154	1586
1959	11189	49	682	2694	3376	1516	158	1674
1960	12542	46	1093	2307	3400	2247	224	2471
1961	13435	46	N/A	N/A	3398	2048	326	2374
1962	14811	48	N/A	N/A	3245	2595	441	3036
1963	13717	45	N/A	N/A	3384	2046	296	2342
1964	15389	46	N/A	N/A	3930	2160	308	2468
1965	16690	46	1158	3313	4291	2204	434	2638

Note: For each country, production by company does not always add up exactly to the total production given in every year. This is because (i) the total production by country is given on a wholly dried bases, while production by company is sometimes given on a partly dried basis, and (ii) in some cases, company production figures actually refer to company export figures where, all of a company's production is exported. There will, of course, be slight differences between production and exports in these cases because of changes in stocks.

* See following page for Jamaica, Dominican Republic, and Haiti

TABLE 24 (cont'd)

CARIBBEAN BAUXITE PRODUCTION BY COUNTRY AND COMPANY, 1950-65
000 LONG DRY TONS

	Caribbean Total	Caribbean Percent World Output	- JAMAICA - Alcoa	Aluminium Limited	Reynolds	Kaiser	Total	DOMINICAN REPUBLIC Alcoa Total	HAITI Reynolds Total
1950	3690	45							
1951	4706	45							
1952	5942	47		143	N/A	N/A	381		
1953	7132	53		44	611	499	1154		
1954	7663	48		337	1018	689	2044		
1955	8154	47		463	933	1249	2645		
1956	9052	49		567	955	1619	3141		
1957	10432	52		955	1309	2379	4643		263
1958	10529	51		923	1937	2862	5722		280
1959	11189	49		1003	1003	2298	5125	759	255
1960	12542	46		1564	1576	2599	2599	658	268
1961	13435	46		1651	1769	3164	6663	737	263
1962	14811	48		1571	N/A	N/A	7495	665	370
1963	13717	45		1698	N/A	N/A	6903	761	327
1964	15389	46	200	1789	1822	4200	7811	807	373
1965	16690	46	716		2000		8514	927	320

TABLE 25

ANNUAL PER CENT CHANGE IN BAUXITE PRODUCTION

	JAMAICA	SURINAM	GUYANA	DOMINICAN REPUBLIC	HAITI	TOTAL CARIBBEAN
1951		+ 28.3	+ 26.5			+ 27.5
1952		+ 18.7	+ 17.3			+ 26.3
1953		+ 1.5	+ 15.4			+ 20.0
1954	+ 77.1	+ 2.7	- 19.3			+ 7.4
1955	+ 29.4	- 7.6	+ 5.4			+ 6.4
1956	+ 18.7	+ 11.6	+ 1.9			+ 11.0
1957	+ 47.8	- 3.2	- 12.7			+ 15.2
1958	+ 23.2	- 11.6	- 38.8		+ 6.5	+ 0.9
1959	- 11.6	+ 14.8	- 5.6		- 9.8	+ 6.2
1960	+ 12.1	+ 0.7	+ 47.6	- 15.3	+ 5.1	+ 12.1
1961	+ 16.0	-	+ 4.1	+ 12.0	- 1.9	+ 7.1
1962	+ 12.5	- 4.7	+ 27.9	- 10.8	+ 40.7	+ 10.2
1963	- 8.6	+ 4.3	- 29.6	+ 14.4	- 13.1	- 8.0
1964	+ 13.2	+ 16.1	+ 5.4	+ 6.0	+ 14.0	+ 12.2
1965	+ 9.0	+ 9.2	+ 6.9	+ 14.9	- 16.6	+ 8.5
Average	+ 19.9	+ 5.4	+ 5.2	+ 3.5	+ 3.1	+ 10.9

TABLE 26(A)

QUANTITY OF DRIED BAUXITE EXPORTS

QUANTITY 000 LONG TONS

	JAMAICA	SURINAM	GUYANA	DOMINICAN REPUBLIC	HAITI	TOTAL
1950						N/A
1951		2,555				N/A
1952	240	N/S	1,968			N/A
1953	1,176	3,031	1,904			6,111
1954	1,728	3,240	1,916			6,884
1955	2,172	N/S	1,917			N/A
1956	2,575	3,225	1,780			7,580
1957	3,641	3,131	1,734		318	8,824
1958	4,799	2,702	1,169		317	8,987
1959	4,197	3,147	1,242	397	307	9,290
1960	4,148	N/S	1,788	629	341	N/A
1961	4,975	3,100	1,236	699	289	10,299
1962	5,987	2,900	1,465	704	437	11,493
1963	5,162	N/S	730	759	328	N/A
1964	5,967	N/S	585	746	396	N/A
1965	6,784	N/S	1,257	925	330	N/A

Sources: External Trade Statistics, Each Country.
Bureau of Statistics, Surinam.
N/S : not separable from exports of calcined bauxite.

TABLE 26 (B)

VALUE OF DRIED BAUXITE EXPORTS

VALUE JE MILLIONS

	JAMAICA	SURINAM	GUYANA	DOMINICAN REPUBLIC	HAITI	TOTAL[1]
1950			N/A			
1951			N/A			
1952	0.4		N/A			
1953	2.1		N/A			
1954	3.1		3.4			6.5
1955	3.9		3.4			7.3
1956	4.6		3.8			8.4
1957	9.6	N/S	4.1		1.0	14.7
1958	12.6		2.9		1.0	16.5
1959	11.0		3.1	1.8	1.0	15.9
1960	10.9		3.7	2.8	1.1	18.4
1961	13.1		3.0	3.3	1.0	20.4
1962	15.7		3.5	3.1	1.5	23.8
1963	13.6		2.2	3.5	1.1	20.4
1964	15.7		1.9	3.8	2.0	23.4
1965	17.8		3.1	3.3	1.2	25.4

N/S Not separate from calcined and chemical grade bauxite.

1. Excludes Surinam.

TABLE 27

QUANTITY AND VALUE OF CALCINED BAUXITE EXPORTS
QUANTITY 000 LONG TONS VALUE £ MILLIONS

	QUANTITY			VALUE		
	SURINAM	GUYANA	TOTAL	SURINAM	GUYANA	TOTAL
1950	N/A		N/A	N/A		N/A
1951	N/A		N/A	N/A		N/A
1952	N/A	145	145	N/A		N/A
1953	37	250	287	N/A		N/A
1954	127	209	336	N/A	1.5	N/A
1955	N/A	252	N/A	N/A	1.8	N/A
1956	126	318	444	N/A	2.3	N/A
1957	88	287	375	N/A	2.1	N/A
1958	57	196	263	N/A	1.5	N/A
1959	107	272	379	N/A	2.1	N/A
1960	N/A	307	N/A	N/A	2.4	N/A
1961	147	371	518	N/A	3.0	N/A
1962	187	366	553	N/A	2.9	N/A
1963	N/A	358	N/A	N/A	3.7	N/A
1964	N/A	469	N/A	N/A	4.4	N/A
1965	N/A	491	N/A	N/A	4.6	N/A

Sources: External Trade, British Guiana
U.S. Bureau of Mines: Minerals Yearbook Annual

TABLE 28

QUANTITY AND VALUE OF ALUMINA EXPORTS

	QUANTITY 000 SHORT TONS				VALUE JŁ MILLIONS			
	JAMAICA	SURINAM	GUYANA	TOTAL	JAMAICA	SURINAM	GUYANA	TOTAL
1954	139			139	2.9			2.9
1955	206			206	4.8			4.8
1956	232			232	5.8			5.8
1957	488			488	11.9			11.9
1958	418			418	9.1			9.1
1959	447			447	9.4			9.4
1960	745			745	16.6			16.6
1961	787		134	921	16.9		2.5	19.4
1962	704		241	945	14.4		4.7	19.1
1963	813		242	1,055	15.9		4.6	20.5
1964	860		274	1,134	18.2		5.6	23.8
1965	807	67	291	1,165	17.5	1.2	6.0	24.7
1966		384				5.9		

Sources: External Trade, Jamaica.
External Trade, British Guiana.
Bureau of Statistics, Surinam.

TABLE 29 (a)

UNIT VALUE OF EXPORTS
DRIED BAUXITE £ PER LONG TON

	JAMAICA	SURINAM	GUYANA	DOMINICAN REPUBLIC	HAITI	TOTAL
1950		N/A	N/A			N/A
1951		N/A	N/A			N/A
1952	1.75	N/A	N/A			N/A
1953	1.79	2.32	N/A			N/A
1954	1.79	2.46	1.76			2.11
1955	1.79	2.41	1.76			N/A
1956	1.79	2.42	3.13			2.14
1957	2.62	2.80	2.35		3.23	2.66
1958	2.62	2.87	2.49		3.12	2.69
1959	2.62	2.76	2.46	4.54	3.11	2.65
1960	2.62	3.33	2.09	4.50	3.18	N/A
1961	2.62	3.52	2.39	4.72	3.36	3.04
1962	2.62	3.52	2.42	4.42	3.35	2.96
1963	2.62	3.67	2.99	4.60	3.42	N/A
1964	2.62	3.50	3.29	5.13	5.09	N/A
1965	2.62	3.38	2.47	3.52	3.56	N/A

Sources: Calculated from Tables 26 to 28.
U.S. Bureau of Mines, Minerals Yearbook, Annual.

TABLE 29 (b)

UNIT VALUE OF EXPORTS

	ALUMINA £ PER SHORT TON				CALCINED BAUXITE £ LONG TON		
	JAMAICA	SURINAM	GUYANA	TOTAL	SURINAM	GUYANA	TOTAL
1950					N/A		
1951							
1952							
1953							
1954	20.86			20.86		7.06	
1955	23.22			23.22		7.10	
1956	25.01			25.01		7.30	
1957	24.41			24.41		7.22	
1958	21.85			21.85		7.62	
1959	21.04			21.04		7.75	
1960	22.33			22.33		7.85	
1961	21.45		18.66	21.06		8.02	
1962	20.49		19.63	20.21		8.04	
1963	19.62		19.20	19.43		10.47	
1964	21.14		20.33	20.99		9.28	
1965	21.67	17.55	20.66	21.18		9.32	

GEOLOGICAL SURVEY OF BRITISH GUIANA

MAP SHOWING EXCLUSIVE PERMISSIONS HELD AND APPLIED FOR BY DEMERARA BAUXITE CO. LTD.

OCTOBER - 1965

10 5 0 10 20
MILES

AREAS HELD UNDER E. P's
AREAS UNDER APPLICATION 1 2 3 4 5

58°
7°
6°
5°
ATLANTIC OCEAN
Pomeroon R.
Supenaam R.
GEORGETOWN
4
107,000 Acres
1
109,000 Acres
Boerasirie R.
Komuni R.
DEMERARA RIVER
Atkinson Airport
Mahaica R.
Mahaicony R.
Abary R.
NEW AMSTERDAM
DEMERARA RIVER
Bartica
CUYUNI R.
MAZARUNI R.
Ikuribisi R.
ESSEQUIBO
5
125,000 Acres
E.P. No. 500
291,272 Acres
M.P. 1304/56
MACKENZIE
Kara-kara R.
3
495,500 Acres
Wiruni R.
E.P. No. 565
354,000 Acres
105,000 Acres
E.P. No. 445
253,920 Acres
Ituni R.
Demerara River
E.P. No. 513
Dukalika R.
2
Kibiliburi R.
29,167 Acs.
15,200 Acs.
E.P. No. 377
Kuruduro R.
Kwakwani
Berbice River
Canje R.
Wikki R.
CORENTYNE R.
SURINAM

TRACED FROM G.S. TOPO. MAP 1/1,000,000

The period after 1950 saw a steep decline in the rate of growth of output. In the fifteen years between 1950 and 1965, production grew at an annual average of 5.2 percent only, less than half the rate of growth of the world bauxite output. This was the result of decisions by Aluminium Ltd. and Reynolds. The former company, which owns the bulk of Guyanese deposits, "shifted terrain" in large part to Jamaica. Alumina produced from Jamaican bauxite fed the expansion of this company's smelter capacity in the period, while Guyanese output of metal-grade bauxite was held relatively stable. Guyana's competitive advantage in relation to Jamaica, within the framework of an MNC, resulted in the slowing down of the growth of bauxite drawn from the country by the company which had acquired most of its deposits. (See Figure Two).

Reynolds purchased the only other producer of bauxite in Guyana in the early 1950's and began production in 1953. But the total did not grow substantially over time, as Reynolds supplied most of its input requirements from Jamaica. The company's behaviour suggests that its Guyanese deposits were used more as a "reserve" and as a means of reducing the deposits available to competitors, than as a major source of metal production. This was probably due to reasons similar to those applying

to Aluminium Ltd. There was also the fact that Guyana was controlled from 1953 to 1964 by a Marxist-oriented Government. In fact, during virtually the whole of this period, Reynolds was involved in a prolonged dispute with this Government arising out of its non-payment of income taxes. The company could be expected not to increase production in the country significantly while the terms of its operations in Guyana remained unsettled. In contrast, both Government and Opposition in Jamaica were friendly to foreign capital; and in 1957, Reynolds, along with the other companies, signed a comprehensive twenty-five year agreement with the Jamaica Government covering taxes and mining concessions.

However, although bauxite output grew slowly in the post-War period, the degree of elaboration grew significantly. By 1965, less than fifty percent of Guyanese bauxite was being exported after drying only. The remainder was either calcined, to produce abraisive and refractory-grade bauxite; or beneficiated, to produce alumina. Both these operations were carried out by Aluminium Ltd. The background to these developments was discussed in the section of this paper dealing with that company.

TABLE 30 (a)

VALUE OF TOTAL BAUXITE-BASED EXPORTS

VALUE JE MILLIONS

	JAMAICA	SURINAM	GUYANA	DOMINICAN REPUBLIC	HAITI	TOTAL
1950	N/A	N/A				N/A
1951	N/A	N/A				N/A
1952	0.4	5.2				N/A
1953	2.8	6.0				N/A
1954	6.0	N/A	4.9			N/A
1955	8.7	7.4	5.2			19.8
1956	10.4	8.4	6.1			23.2
1957	21.5	9.6	6.2		1.0	35.4
1958	21.7	9.0	4.4		1.0	34.3
1959	20.4	11.2	9.6	1.8	1.0	41.8
1960	27.5	12.2	6.1	2.8	1.1	47.3
1961	30.0	11.9	8.5	3.3	1.0	52.3
1962	30.1	11.5	11.1	3.1	1.5	55.0
1963	29.5	12.2	10.5	3.5	1.1	54.4
1964	33.8	13.4	11.9	3.8	2.0	62.2
1965	35.3	16.1	13.7	3.3	1.2	65.4
1966	37.6	22.8	16.2			

1.1f = £ 0.185
Sources: External Trade Accounts, each country.

TABLE 30 (a)

VALUE OF TOTAL BAUXITE-BASED EXPORTS

VALUE £ MILLIONS

	JAMAICA	SURINAM	GUYANA	DOMINICAN REPUBLIC	HAITI	TOTAL
1950	N/A	N/A				N/A
1951	N/A	N/A				N/A
1952	0.4	5.2				N/A
1953	2.8	6.0				N/A
1954	6.0	N/A	4.9			N/A
1955	8.7	7.4	5.2			19.8
1956	10.4	8.4	6.1			23.2
1957	21.5	9.6	6.2		1.0	35.4
1958	21.7	9.0	4.4		1.0	34.3
1959	20.4	11.2	9.6	1.8	1.0	41.8
1960	27.5	12.2	6.1	2.8	1.1	47.3
1961	30.0	11.9	8.5	3.3	1.0	52.3
1962	30.1	11.5	11.1	3.1	1.5	55.0
1963	29.5	12.2	10.5	3.5	1.1	54.4
1964	33.8	13.4	11.9	3.8	2.0	62.2
1965	35.3	16.1	13.7	3.3	1.2	65.4
1966	37.6	22.8	16.2			

1.1f = £ 0.185
Sources: External Trade Accounts, each country.

TABLE 30 (b)

SHARE IN TOTAL MERCHANDISE EXPORTS

PERCENT

	JAMAICA	SURINAM	GUYANA	DOMINICAN REPUBLIC	HAITI	TOTAL
1950		N/A	N/A			
1951		N/A	N/A			
1952	2.4	N/A	N/A			
1953	11.3	62	N/A			
1954	20.0	N/A	N/A			
1955	27.4	80	N/A			
1956	27.2	76	31			
1957	43.3	81.1	27			
1958	46.5	79	22			
1959	45.1	78	44			
1960	49.4	79	23			
1961	49.6	82.6	27		9.0	
1962	48.4	79	32			
1963	42.0	N/A	30			
1964	44.7	80.9	34			
1965	47.0	N/A	37			
1966	47.6	N/A	40			

TABLE 31 (a)

BAUXITE-BASED G.D.P.

IN J$ MILLION

	JAMAICA	SURINAM	GUYANA	DOMINICAN REPUBLIC	HAITI
1950		N/A	N/A		
1951		N/A	N/A		
1952		N/A	N/A		
1953	2.6	N/A	4.2[1]		
1954	4.7	N/A	N/A		
1955	6.5	N/A	4.0		
1956	8.1	5.9	4.9		
1957	16.1	7.0	5.1		N/A
1958	16.5	6.3	3.9		N/A
1959	14.9	8.2	5.1	N/A	N/A
1960	19.6	8.6	6.1	N/A	N/A
1961	20.7	8.5	7.8	N/A	N/A
1962	21.7	8.6	4.0	N/A	N/A
1963	21.7	9.2	7.3	N/A	N/A
1964	24.1	N/A	11.1	N/A	N/A
1965	24.1	N/A	13.0	N/A	N/A

[1] Includes small amount of Manganese Mining.

Sources: Natural Accounts, each country.
United Nations Yearbook of Natural Accounts Statistics.

TABLE 31 (b)

SHARE OF BAUXITE-BASED G.D.P. IN TOTAL G.D.P.

PERCENT . . .

	JAMAICA	SURINAM	GUYANA	DOMINICAN REPUBLIC	HAITI
1950		N/A	N/A		
1951		N/A	N/A		
1952		N/A	N/A		
1953	2.3	N/A	11.3		
1954	3.8	N/A	N/A		
1955	4.6	N/A	9.9		
1956	5.1	32.9	11.3		
1957	8.4	34.1	10.9		N/A
1958	8.3	29.7	8.8		N/A
1959	7.5	32.3	11.1	N/A	N/A
1960	9.1	31.7	11.0	N/A	N/A
1961	9.0	28.4	12.9	N/A	N/A
1962	9.1	28.4	16.2	N/A	N/A
1963	8.3	28.6	13.0	N/A	N/A
1964	8.8	N/A	17.1	N/A	N/A
1965		N/A	N/A	N/A	N/A

The value of Guyanese bauxite increases by approximately one-half when calcined, and by about four times when converted into alumina. Thus, the Gross Value of bauxite-based exports has grown much more than that of the output of bauxite itself. Between 1955 and 1965, for instance, bauxite output grew by 8.3 percent but the value of bauxite-based exports grew by two hundred and twenty percent. This was the result of the emergence and growth of exports of calcined bauxite and alumina.

Another result of the growth of elaboration of the ore locally was to raise the share of the industry in merchandise exports and in the Gross Domestic Product by Industrial Origin. It is difficult, however, to assess the importance of the industry to the natipnal economy by the use of these data, since the "import-content" of exports, and of the industry's Domestic value added, is high.

Surinam

Surinam has experienced a similar pattern of development to Guyana over the life of the industry. Output climbed fairly quickly after production began, but fell during the depression years. In the later 1930's, production began to climb rapidly, and continued doing so virtually without interruption until 1952. But after that year the growth rate fell steeply.

Thus, the level of output which had grew more than sixfold in the thirteen years between 1939 and 1952, increased by one-third only in the thirteen years between 1952 and 1965.

As table twenty-four shows, the slowing down of Surinam's growth was associated with the slowing down of Alcoa's production growth in that country. In turn, this was due to the diversification of supply sources of that company, to the Dominican Republic and Jamaica. There was also the fact that the growth of Alcoa's aluminium production was less than that of the U.S. aluminium industry as a whole, since Alcoa's share of U.S. aluminium production was declining.

In 1943, a second company, named Billiton, had joined Alcoa in production in Surinam. This company is Dutch in ownership and also produced bauxite in Indonesia until its mines there were expropriated. It has not, however, been able to achieve a high level of output in Surinam. There are two probable reasons for this. One is the fact that Alcoa secured a large part of the easily-mined reserves from early in the century, and in 1958 was granted mining rights over additional areas. The second reason is the fact that Billiton is not vertically integrated, but rather produces bauxite for commercial sale. In fact, Billiton has relied heavily

on the United States market for sales of its ore. It has been able to find outlets for its relatively small output, in the form of sales to the U.S. Government and companies during the Second World War when bauxite was scarce, to Reynolds and Kaiser in the early post-war period, and to the smaller companies in the 1950's.

The record of Billiton's production between 1950 and 1960 is one of violent fluctuation from year to year. A slight upward trend can be discerned, but this was not sufficiently strong to warrant the conclusion that Billiton can contribute significantly to the growth of output in Surinam.

Like Guyana, there was an increase in the proportion of bauxite processed in Surinam since 1950. Up to the early 1960's, this was associated with the growth of calcined bauxite production. In 1965, alumina exports began, and in 1966, small amounts of metal produced from Alcoa's new smelter in that country began coming on to the market. This was the result of the agreement with the Government made in 1958, under which Alcoa committed itself to the construction of an alumina plant and a smelter.

Table thirty shows that between 1952 and 1956, the value of bauxite-based exports increased more than fourfold, although output in the same period was not quite doubled. The reason for this was the steady rise in imputed bauxite prices following the 1958 agreement, and the growth of high-valued exports to calcined bauxite and alumina.

More than the other Caribbean bauxite producers, the industry dominates the economy of Surinam in the proportion of export value and of the Gross Domestic Product it contributes. During the 1950's, the share of bauxite-based exports in total exports grew steadily from around sixty to over eighty percent. During this period, the share of the industry in the Gross Domestic Product By Industrial Origin was falling slightly, from thirty-three to twenty-nine percent. However, it is likely that, with the growth of alumina and metal production, the share of the industry in total G.D.P. will rise.

The general features of output-determination and the degree of elaboration for Surinam can, therefore, be summarised as follows. As a result of Alcoa's monopolisation of the U.S. aluminium industry and its decision to draw its incremental bauxite requirements to substitute Surinam bauxite, together with Guyanese, for domestic ore, output in Surinam

followed the level of output in the North American aluminium industry, and shared in the expansion which took place from the late 1930's. But in the 1950's, the steady decline in Alcoa's share of the U.S. market, brought about in large part by U.S. Government action, together with Alcoa's decision to "shift terrain" to the Dominican Republic and Jamaica, reduced the rate of growth of Alcoa's production in Surinam. At the same time, the company's agreement with the Government, to process a substantial part of its bauxite output into alumina locally, to produce aluminium, and to revalue its bauxite exports, led to a substantial growth of the value of the industry's exports.

The Dominican Republic and Haiti

Both these countries, which share the island of Hispaniola, have a relatively small endowment of bauxite deposits. They have, therefore, been used as supplementary or reserve sources of bauxite by the companies which engrossed their deposits - Alcoa in the Dominican Republic and Reynolds in Haiti. Of the two countries, the Dominican Republic has so far experienced the higher rate of growth and greater level of output of the two. This due to the fact that, relative to Haiti, the Dominican Republic has a greater endowment of reserves, and "competes" with bauxite, through the framework of the MNC, with bauxite which is probably more costly to mine,

and certainly more distant from processing plants, than the bauxite with which Haitian ore competes.

Bauxite and Economic Growth: The Case of Jamaica.

Perhaps the most important feature of the Caribbean bauxite industry in the post-War period was the decision of three of the four North American aluminium majors to draw the overhwelming majority of their incremental raw material requirements from Jamaica. In this period, there was a high and sustained growth of aluminium consumption in the United States, where these three companies sell most of their aluminium; and in the rest of the non-communist world, where they were engaged in an aggressive search for markets. Although the share of these majors in the satisfaction of the non-communist world's consumption of aluminium declined, their continuing preponderance in the industry, and the high rate of growth of demand, resulted in a three-fold expansion of their aluminium production between 1950 and 1965. In the resulting three-fold expansion of their bauxite requirements, the Guianas supplied about one and-a-half million tons, Hispaniola about one-and-one-third million, and Jamaica about eight-and-a-half million tons. Jamaica became the world's largest producer of bauxite in 1957 and has remained in this position ever since.

Table twenty-four shows that the largest producer in Jamaica is Kaiser, which draws all its ore requirements for its U.S. production from Jamaica. Aluminium Ltd. and Reynolds also produce substantial tonnages, and Alcoa's output is not insignificant. The companies' decisions have given rise to an annual average increase in total Jamaican production since 1954 of close to twenty percent.

In what follows, we shall examine some aspects of the relationship between the industry and the economy of Jamaica. The stages of "engrossment" and the establishment of infrastructure by each company are outlined, as are the phases in the expansion of capacity and production. In greater detail, we look at the industry's investment, exports and value added in the domestic economy. Then we attempt to show the role of the industry in the national economy with the aid of the concepts embodied in the "Accounting Framework for Plantation Economy Further Modified."

Stages of Development

The phases in the industry's development can be distinguished as follows:

(1) 1943 to 1950: Initial "engrossment".
(2) 1950 to 1953: Establishment of infrastructure, and initial capacity.
(3) 1956 to 1957: Expansion of capacity.
(4) 1964 to 1970: Establishment of new infrastructure and expansion of capacity.

The initial engrossment of Jamaican deposits began by Aluminium Ltd. in 1943, by Reynolds in 1944, and Kaiser in 1947. Prospecting, exploration, sampling of deposits and the purchase of bauxite properties proceeded rapidly. The course of acquisition of real estate is indicated by the data in Table thirty-two.

It seems clear that these three companies acquired the bulk of the best Jamaican deposits within the space of a few years. Most of the extensive land holdings of the companies were in the parishes of St. Ann, Manchester, and St. Elizabeth, where the richest deposits of bauxite occur.[38] One of the latecomers to the scene in Jamaica, British Aluminium Company, began prospecting in 1952, but one year later abandoned its concessions as "the larger and more accessible deposits (had) already been acquired by other companies."[39] In 1952, the proved reserves of ore in Jamaica were estimated to be at a minimum of one hundred and fifty tons; the known reserves owned or controlled by the three companies amounted to one hundred and thirty million tons.[40]

The establishment of infrastructure by these companies all began around 1950. The pace of completion was considerably accelerated by the expanded military demand induced in the United States by the Korean War.

TABLE 32

ACREAGE OWNED BY THE NORTH AMERICAN MNCs IN JAMAICA, 1952, 1956.

	1952	1956
Aluminium Ltd.	30,000	32,136
Reynolds	50,000	53,034
Kaiser	19,000	65,941
Total	99,000	151,111

Total Jamaican Land Area: 2,823,000 acres.

Sources: 1952: V.A. Zans, Bauxite Resources of Jamaica and Their Development. Reprinted from Colonial Geology and Mineral Resources, 1952, Vol. 3, No. 4. Geological Survey Department, Jamaica. London: H.M.S.O. 1954.
1956: "Farming Operations of The Bauxite Companies in Jamaica". Kingston, The Jamaica Agricultural Society, 1957.

As already related, both Kaiser and Reynolds were granted generous assistance by the U.S. Government for the expansion of a specified quantum of new aluminium and alumina capacity. This meant that they could plan the establishment of mining capacity in Jamaica to make it consistent with the expansion of their processing capacity in the United States. For Aluminium Ltd., the establishment of mining and alumina capacity in the island was complementary to the mammoth Kitimat project. Both this company and Reynolds received generous financial assistance from "Marshall Plan" funds as part financing of their capital expenditure in Jamaica.

Kaiser's capacity, established in this period in the parish of St. Elizabeth on the South Coast, was for approximately 2,100,000 wet tons of ore per annum. This was the largest mining capacity established of the three companies. It was planned to meet not only the growth of its requirements, but also to displace the existing supplies which Kaiser had been purchasing, probably from Alcoa. The investment involved equipment for extracting the ore, transporting it to the coast on a company-owned railway, semi-drying, storing, and loading to ore carriers, and port facilities. Up to the end of 1953, total capital investment of the company on the operation was J£ 4.3 Million.

Reynold's capacity which was established in the Northern parish of St.. Ann, was for the smaller production of 900,000 wet tons. This company was supplied with ore from the United States as well, and was at the time actively planning to produce in Guyana and Haiti. The total investment of J£ 6.1 by 1953, embraced mining equipment, trucking to the drying plant, almost complete drying, transport by overhead tramway to the specially built port facilities, loading and shipment on a specially designed self-loading and unloading ore carrier. Inasmuch as Reynolds' investment included two separate ore transport operations, full drying, and acquisition of a specially designed ore carrier, the capital cost was greater than Kaiser's although the capacity established was much lower.

Aluminium Ltd.'s capacity for alumina production was originally planned to be 36,000 long tons per annum; but in successive stages the plans were expanded so that by the end of 1953, the plant's capacity was over 160,000 tons per annum, with further expansions planned. Up to this time, the company's total investment was about J£ 13.5 million. It included, in addition to the direct costs of mining and alumina capacity, the costs of such ancillary facilities as a deep-sea port, storage for alumina, wells drilled for water for the alumina plant, oil-fired boilers for steam and a steam turbine for electric power.

One notable aspect of the establishment of the industry was the way it took the form of setting up "total institutions" in the industry: that is, each company's operation is almost completely self-contained, as was the sugar plantation of the earlier period. Thus, each of the operations of the three companies is not only vertically integrated with the production facilities of its parent MNC, but also provisions itself almost wholly with the ancillary facilities necessary for the extraction and transfer of the mineral resource. Hence, all three of the companies built and operated their own ports, and each company used its own port for its own operations exclusively. Two of the companies shipped the ore on its own ships, which carried materials for own-account production on the return journey from the metropole. Two of them transported the material from mine to port on company-owned transport equipment, and all three produced their own electricity from company-owned plants. This institutional "totality" helps to explain the minimal degree of integration of the industry with local goods and factor markets.

The initial capital investments of the industry was completed by the end of 1953, and in the following three years the production of all three companies quickly approached full capacity. In 1956 and 1957, all three

of the companies embarked on expansion programmes. For Kaiser and Reynolds, these were complementary to the expansion of aluminium and alumina capacity begun in 1954 and 1955, after the Korean War expansion had been completed. The former company increased its capacity to 3,600,000 wet tons, the latter to 1,900,000 wet tons.

For Aluminium Ltd., the expansion of alumina capacity was carried out to feed the projected new requirements of the expanded smelter at Kitimat, and the needs of Scandinavian smelters to which the company was affiliated. The alumina plant's capacity was raised to 500,000 tons. At the same time, the company started construction of its second alumina plant, which was completed in 1960.

Meanwhile, between 1957 and 1964, neither Kaiser nor Reynolds embarked on any major expansion programmes. The capacity of the industry as a whole was, however, increased by the entry of Alcoa in the 1959-1963 period. In these four years, this company established equipment for mining, transport to a company-built and operated port, drying and shipment. The annual capacity was for approximately 1,000,000 tons of ore and the capital cost was JŁ five million.

In 1964 and after the recovery of aluminium consumption in the United States resulted in the growth of aluminium production by the four North American majors to full or near-full capacity. They all began expansions to their smelting and alumina capacity to meet the planned growth of output. Kaiser, Reynolds and Aluminium Ltd. all began expansions to their capacity in Jamaica to meet the raw material requirements of this expansion. Kaiser raised the capacity of its original operation on the south coast to four and a half million tons, and built a large new operation on the north coast, complete with port facilities, for the mining, drying, and shipment of 1,500,000 tons a year. The cost of the new development was J£ 10.7 million. Reynolds announced in 1966 plans to expand its total capacity for mining and export from two million to four million wet tons per annum by 1970, at a cost of J£ 4.7 million. Kaiser and Reynolds, together with Anaconda, began construction of a large alumina plant with a capacity of 950,000 tons and a capital cost of J£ 62 million, to be completed in 1969.

Between 1965 and 1967, Aluminium Ltd. announced plans for the expansion of alumina capacity totalling 349,000 tons, which would bring its total alumina production up to 1,200,000 tons by 1970. The new expansions involved a probable capital expenditure of J£ 13 million.

Capital Investment

The periods of substantial capital investment in the industry were (i) 1950-1953, (ii) 1956-58, and (iii) 1965-1970. In table thirty-three, we show data on the total Gross Investment in the industry up to 1961, and indicate its importance to the total of capital inflows to the economy and the total of Gross Investment for Jamaica.

The date indicate the overwhelming importance of the industry in the capital formation of the Jamaican economy in the 1950-1959 period. Investment in the industry was the chief form of foreign investment, and also the largest single form of investment, in the economy in this period.

Inasmuch as the investment involved heavy equipment such as earth scrapers, trucks, and conveyor belts, however, it had a high import content. The local component of the investment consisted chiefly of purchases of building materials, chiefly cement, and the labour cost of building the physical structures, and installing the mining beneficiation, and transport equipment.

Table thirty-four gives some data on the proportion of the industry's capital expenditures which was spent on local purchases of goods and services.

TABLE 33

GROSS INVESTMENT IN THE BAUXITE/ALUMINA INDUSTRY IN JAMAICA, 1950-1961.

	Total JŁ Mn.	Percent Total Capital Inflow To Jamaica	Percent Total Gross Investment in Jamaica.
1950	1.0		
1951	3.7	84.1	19.5
1952	7.5	144.2	30.5
1953	6.2	133.0	55.0
1954	1.3	27.1	44.0
1955	4.2	44.7	7..5
1956	11.6	68.6	20.0
1957	10.7	65.1	30.0
1958	4.6	3.1	20.5
1959	1.6	8.6	9.8
1960	1.8	11.3	3.2
1961	1.3	12.5	3.5
TOTAL:	35.5	45.8	14.6

TABLE 34

LOCAL COMPONENT OF GROSS INVESTMENT IN THE BAUXITE/ALUMINA INDUSTRY. (J£ Million)

	(1) Total Gross Investment	(2) Local Capital Expenditure	(2) as percent of (1)
1953	6.2	2.1	33.6
1954	1.3	0.6	46.1
1955	4.2	1.2	29.0
1956	11.6	N/A	
1957	10.7	N/A	
1958	4.6	3.2	69.6
1959	1.6	1.2	75.0
1960	1.8	0.7	38.9
1961	1.3	0.8	61.5

The data are limited by the fact that for the years in which the largest investments took place, 1956 and 1957, the local component is not available. The high shares of the local component in the total were for years in which the total was low. It is notable that in the years for which data is available, the average local component for 1953, 1955 and 1958, when the totals were highest, was forty-three percent.

Gross Output

Since the entire output of bauxite and alumina produced is exported, the value of exports can be taken to be the value of Gross Output. Table thirty shows that the value of exports had grown to JE thirty-eight million by 1966. Of this total, slightly under one-half was due to exports of bauxite, the remainder was due to alumina exports. Thus, the twenty-two percent of bauxite processed into alumina within Jamaica yielded as slightly more export value than the seventy-eight percent of output that was exported after drying only.

The growth in the imputed value of bauxite exports was due partly to the steady growth of the volume of exports, partly by a revaluing of the imputed price in 1957 which raised it by forty-six percent. The growth of the value of alumina exports was due almost entirely to the growth of physical production, as prices did not experience any significant

upward trend over the period. (see also table twenty-nine.)

The industry's Gross Domestic Product grew almost tenfold between 1953 and 1964. At present, it's share in the total Jamaican G.D.P. is nine percent, compared to zero in 1950.

The "Local Share" of the Industry.

Neither the data on the industry's G.D.P. nor on its export value, give an adequate representation of its effect on the national economy of the country. The former excludes purchases of intermediate goods from the national economy, and includes that share of value added which does not accrue to the national economy: i.e. profits and depreciation.

What is more useful, therefore, is to disaggregate the activity of the industry into intermediates purchased and value added, and to examine the "national" content of each and compare it with the "foreign" content. This will give an indication of the disposition between Hinterland and Metropole of the income created directly by the industry.

As a first step we have disaggregated the Gross Output of the industry into Intermediates and Value Added for the years 1959 to 1966, using data extracted from the National Income worksheets of the Jamaica Department of Statistics. The results are shown in table thirty-five. They relate to that section of the industry which is concerned with the mining and drying of bauxite for export without further elaboration, and to the section which carries out the activities of mining, drying, and beneficiation. This will be referred to as the "multiproduct" operation.

The first notable feature is the high share of value added in Gross Output, and the correspondingly low share of intermediates. This feature is more pronounced for the dried bauxite operation (eighty-six percent value added in Gross Output) than for multi-product operation (sixty-nine percent). This is to be expected, since in mining and drying bauxite the chief inputs are capital and labour. The only intermediates used of any consequence are fuel oil, for the machinery, and possibly explosives for blasting. In beneficiation, more materials are used up per ton of ore; such as caustic soda, starch, filter cloth, and mineral lime.

Over the seven year period, there appears to have been a tendency for the share of intermediates to increase in the dried bauxite operation,

TABLE 35 (a)

SHARE OF INTERMEDIATES AND VALUE ADDED IN GROSS OUTPUT, NATIONAL CONTENT

		--- TOTAL ---		--- NATIONAL CONTENT ---		
		Intermediates	Value Added	Intermediates	Value Added	Total
Dried Bauxite	1959	13	87	10	39	49
	1960	16	84	13	41	54
	1961	17	83	14	41	52
	1962	17	83	14	38	52
	1963	16	84	12	39	51
	1964	16	84	14	39	53
	1965	16	84	14	39	53
	1966	16	84	13	39	51
	Total	16	84	13	39	52
Multi-product	1959	36	64	17	23	40
	1960	30	70	11	27	38
	1961	32	68	12	32	44
	1962	33	67	13	30	43
	1963	30	70	13	30	43
	1964	29	71	11	30	41
	1965	30	70	13	30	43
	1966	30	70	13	30	43
	Total	31	69	13	30	43
Both Activities	1959	24	76	13	30	43
	1960	24	76	11	33	44
	1961	25	75	13	36	49
	1962	25	75	13	34	47
	1963	23	77	12	35	47
	1964	22	78	12	35	47
	1965	23	77	14	34	48
	1966	23	77	14	34	48
	Total	24	76	13	34	47

Source: Extracted from National Income Worksheets, Kingston, Department of Statistics.

TABLE 35 (b)

SHARE OF INTERMEDIATES AND VALUE ADDED IN GROSS OUTPUT, FOREIGN CONTENT

		TOTAL		FOREIGN CONTENT		
		Intermediates	Value Added	Intermediates	Value Added	Total
Dried Bauxite	1959	13	87	3	48	50
	1960	16	84	3	43	46
	1961	17	83	3	42	45
	1962	17	83	3	45	48
	1963	16	84	3	45	48
	1964	16	84	2	45	47
	1965	16	84	2	45	47
	1966	16	84	3	45	48
	Total	16	84	3	45	48
Multi-product	1959	36	64	19	41	60
	1960	30	70	19	43	62
	1961	32	68	20	36	56
	1962	33	67	20	37	57
	1963	30	70	17	40	57
	1964	29	71	18	41	59
	1965	30	70	17	40	57
	1966	30	70	17	40	57
	Total	31	69	18	39	57
Both Activities	1959	24	76	11	46	57
	1960	24	76	13	43	56
	1961	25	75	12	39	51
	1962	25	75	12	41	53
	1963	23	77	11	42	53
	1964	22	78	10	43	53
	1965	23	77	9	43	52
	1966	23	77	9	43	52
	Total	24	76	11	42	53

and decline in the multi-product. For the former, this may be due to rises in the unit prices of intermediates, or a greater consumption of intermediates per unit of output, or economies in the use of factor inputs relative to intermediate inputs. For the latter, opposite trends may have been at work. It is not possible to say, with the data we have, which of these developments were taking place.

The overall result of the low share of intermediates in Gross Output for mining and drying, and the fact that little elaboration beyond this stage takes place, is a low share of intermediates in the total Gross Output of the industry as a whole. When both operations are summed and averaged out for the seven-year period, the share is twenty-four percent only.

The chief influence on the Local Share of the Industry is therefore the share of value added which accrues to national as compared to foreign factors of production. Since it is a basic institutional feature of the industry that it is operated by MNCs, it follows that the capital is foreign-owned. The chief influence on the local share is, therefore, the returns to capital as compared to the returns to labour. Other things being equal, the higher the share of returns to capital in

value added (gross profit) the higher the foreign content of value added. For while it is the case that a part of the return to capital accrues to national factors in the form of tax payments to the national Government; this is, by definition only a part, whereas the whole or nearly the whole accrual to labour is earned by national factors of production.[41]

In turn, the chief influence on the share of capital in value added is the capital/labour ratio employed in the production processes. Other things held equal, a high capital/labour ratio results in a high share of gross profit in value added. This is typically the case in bauxite mining and beneficiation. From the description given of the processes used in the industry, and the techniques employed by the companies in Jamaica, it is evident that the industry is highly capital-intensive. An example may be provided by the fact that, in 1960, the value of fixed assets per man employed in the industry in Jamaica was J£ 12,342. For most sectors in manufacturing industry at this time, the equivalent figure ranged from J£ 400 to £ 2,000. The nearest capital/labour ratio in manufacturing was in sugar milling, where fixed assets per man employed were valued at £ 2,600.

The result is that the share of wages in value added in the Jamaican industry is low. In Table thirty-four, it is shown that the average

JAMAICA PERCENT SHARE OF WAGES, TAXES, DEPRECIATION AND NET PROFIT IN VALUE ADDE
IN THE BAUXITE INDUSTRY

		Wages	Taxes	Depreciation	Net Profit
Dried Bauxite	1959	13.1	30.8	9.8	45.4
	1960	15.4	32.8	10.1	40.7
	1961	15.0	33.2	9.1	41.9
	1962	13.8	30.7	10.4	43.0
	1963	15.2	30.6	12.0	40.7
	1964	15.2	30.6	12.0	40.7
	1965	15.2	30.6	12.0	40.7
	1966	15.2	30.6	12.0	40.7
	Total	14.8	31.2	11.1	41.6
Multi-Product	1959	15.9	15.5	27.7	30.1
	1960	14.0	22.9	20.7	38.2
	1961	15.6	29.1	21.5	31.7
	1962	20.8	24.7	23.7	28.4
	1963	18.8	21.8	23.1	34.1
	1964	18.8	21.8	23.1	34.1
	1965	18.8	21.7	23.2	34.1
	1966	18.8	21.7	23.2	34.1
	Total	17.8	22.7	23.0	33.4

Source: As for Table 33.

wage component of value added for 1959-1966 has been fifteen percent for dried bauxite, and eighteen percent for multiproduct. Both operations have exhibited a slight tendencey for the wage component to grow over time.

Gross profit, which is correspondingly high, is divided up between taxes, depreciation, and net profit. In the case of dried bauxite, taxes are fixed per ton of ore exported, and vary only with the price of aluminium. The value of the ore for statistical purposes has been fixed at one level since 1957. The stability of per unit taxes in a fixed unit value has resulted in a relatively stable share of taxes in value added - an average of thirty-one percent. Thus, the chief components of the Local Share in value added for dried bauxite give rise to a total which is less than fifty percent in total value added.

The remaining components are depreciation, and net profit. The former varies with the accounting practices and the age of the capital assets in use. Net profit is, in this case, merely a residual arrived at after deducting the other components of value added, and intermediates, from the imputed Gross value of output.

The multi-product operation includes alumina production, which is relatively more capital-intensive than mining and drying only. It is, therefore, surprising to note in Table thirty-five , a higher share of wages in value added for this operation. The reason for this is not immediately clear: it could, for instance, be due merely to a relative undervaluation of dried bauxite compared to alumina, resulting in a relatively lower "statistical" Gross profit. Later on, we advance evidence that Jamaican bauxite has, in fact, been undervalued.

The capital-intensity of the multi-product operation is revealed in the high share of depreciation in value added. In part, this must be due to the fact that the period to which the data relate includes the first five years operation of the second alumina plant, when accelerated depreciation allowances were in effect. The general level is, however, well above that of dried bauxite. The result of the high share of depreciation is to reduce the share of taxable profit in value added therefore, the share of taxes. Thus, the share of taxes and wages together in value added is actually lower for the multi-product operation (average forty percent) than for dried bauxite only (average forty-five percent). It should, however, be noted that the absolute yield of wages and tax payments, per ton of bauxite produced, is far higher in the

multi-product operation than in the dried bauxite operation, since in the former case wages and taxes are paid out in respect of the elaboration of the ore.

We turn next to the disposition of intermediates as between national and foreign sources. Table thirty-seven shows that for dried bauxite, the bulk of intermediate inputs are services rather than goods. If, for example, we assume that all imported inputs consisted of goods, the total of all goods inputs (purchases of manufactured goods locally plus imports) would still amount to only twenty-two percent of all intermediates in 1966. Since the mining and drying of bauxite uses few materials, the bulk of its small intermediate purchases consists of services such as transport, public utility services, construction, and so on. And since services are, in the main, non-transportable, these intermediates are supplied principally from local sources.

The share of commodity inputs in intermediates for the multi-product operation is far higher - in fact, over fifty percent. This is, of course, a reflection of the amount of materials used up in the beneficiation process. As table thirty-seven shows, almost all these goods inputs are, in fact, imported. The result is that the national

TABLE 37 (a)

SOURCE OF DOMESTIC INPUTS IN TOTAL INTERMEDIATES, PERCENT

	Manufacture	Distribution	Public Utilities	Transport	Building Construction	Other Services
Dried Bauxite						
1959	4.9	4.7	0.4	25.0	41.4	
1960	2.9	3.8	0.3	41.2	33.6	
1961	3.1	4.2	0.2	37.7	35.6	
1962	3.2	4.2	0.2	40.5	31.7	
1963	3.3	2.7	0.3	35.1	41.2	
1964	3.3	2.8	0.3	35.1	41.3	
1965	3.3	2.8	0.3	35.1	41.3	
1966	3.3	2.8	0.3	35.1	41.3	
Total	3.3	3.4	0.3	36.0	38.5	
Multi-Product						
1959	0.4	0.8	-	17.9	25.1	2.5
1960	0.3	0.6	-	15.3	18.6	1.9
1961	0.3	0.7	-	14.5	21.2	2.0
1962	0.3	0.8	-	14.3	21.7	2.0
1963	-	0.9	-	15.9	22.7	2.2
1964	-	0.9	-	17.1	24.4	2.4
1965	-	0.9	-	15.9	22.7	2.2
1966	-	0.9	-	15.9	22.7	2.2
Total	0.2	0.8	-	15.8	22.2	2.2

Source: As for Table 33.

TABLE 37 (b)

SOURCE OF IMPORTED INPUTS IN TOTAL INTERMEDIATES, PERCENT

		Goods	Services
Dried Bauxite			
	1959		24.0
	1960		19.0
	1961		19.0
	1962		20.0
	1963		18.0
	1964		18.0
	1965		18.0
	1966		18.0
Total			18.5
Multi-Product			
	1959	48.6	5.4
	1960	59.8	3.2
	1961	58.0	4.0
	1962	57.3	1.7
	1963	49.6	8.4
	1964	53.3	8.7
	1965	49.6	8.4
	1966	49.6	8.4
Total		51.5	6.3

content in intermediates in the multi-product operation, where the share of intermediates in Gross output is higher; is only forty-two percent. In dried bauxite, the national content in intermediates is high, but the importance of this is reduced by the fact that the share of intermediates in Gross output is low.

The net result of the low national content of value added in both operations, and the low national content in the intermediates of the multi-product operation where the share of intermediates is higher, is a low overall Local Share. Table thirty-five shows that the average for both operations for the eight years is forty-seven percent. As already indicated in the previous theoretical discussion of Multinational Corporations and Mineral Industry in the Caribbean, this is due to the institutional organisation of the industry - the fact of foreign ownership - and the way this conditions the sources of supplies and the capital/ labour ratio employed, in conjunction with the inherently capital-intensive nature of the techniques of mining and processing mineral ores.

The fact that the Local Share in dried bauxite is higher than that in the multi-product operation (fifty-two percent compared to forty-three percent), should not be taken to indicate that the national

economy benefits more when the bauxite is merely exported without beneficiation. In fact, since the Gross output per ton of ore produced is far higher after beneficiation, the absolute level of payments to the national economy is far higher as a result of processing.

Table thirty-eight shows that for the multi-product operation, where all the bauxite produced is processed into alumina, the payments to the national economy have been frequently over three times, per ton of bauxite produced, than those for mining and drying only. The increased payments arise out of greatly increased purchases of intermediates, greatly increased wage pyaments, and higher taxes.

Table thirty-nine shows an estimate of the total amounts of payments to the Jamaican economy which have been lost as a result of exporting dried bauxite without beneficiation; i.e. the "Muscovado Bias". For each year the amount is expressed as a proportion of the total of Jamaica's Gross National Product for the year. The amounts are considerable, and have, since 1958, formed a steady five to six percent of Jamaica's G.N.P.

TABLE 38

JAMAICA: LOCAL PAYMENTS BY ACTIVITY, PER TON BAUXITE

	DRIED BAUXITE				MULTI-PRODUCT				
	Purchases (1)	Wages (2)	Taxes (3)	Total (4)	Purchases (5)	Wages (6)	Taxes (7)	Total (8)	Ratio 8/4
1959	0.253	0.297	0.699	1.269	1.639	0.982	0.959	3.819	3.01
1960	0.338	0.336	0.713	1.322	1.159	1.031	1.677	4.020	3.04
1961	0.362	0.331	0.732	1.442	1.241	1.057	2.134	4.395	3.05
1962	0.355	0.294	0.657	1.350	1.230	1.349	1.600	4.179	3.09
1963	0.335	0.333	0.669	1.348	1.146	1.202	1.392	3.882	2.88
1964	0.367	0.337	0.677	1.392	1.037	1.300	1.501	3.990	2.87
1965	0.363	0.334	0.671	1.385	1.259	1.322	1.521	4.258	3.07

Source: As for Table 33.

TABLE 39

Jamaica: Local Payments Foregone as a Result of External Beneficiation, 1953 - 1965

	(1) Local Payments Foregone per ton bauxite exported J$	(2) Total Local Payments Foregone J$ 000	(3) (2) as Percent Jamaican G.N.P.
1953	2.617	3,078	2.7
1954	2.617	4,522	3.5
1955	2.617	5,684	3.9
1956	2.617	6,739	4.0
1957	2.617	9,528	4.8
1958	2.617	12,559	6.1
1959	2.550	10,702	5.1
1960	2.698	11,191	5.0
1961	2.953	14,691	6.1
1962	2.829	16,937	6.8
1963	2.534	13,080	4.9
1964	2.598	15,502	
1965	2.873	19,490	

SOURCES:

Column (1): 1953 - 1958: Huggins, op.cit., p.124
1959 - 1965: Calculated from National Income Worksheets, Department of Statistics, Kingston.

Column (2): Column (1) multiplied by total Jamaican bauxite exports for the year in question.

The Foreign Exchange Contribution

Obviously, the low Local Share in the industry means that the imputed export value overstates the actual contribution of the industry to the national economy's supply of foreign exchange. Table forty measures the importance of the foreign exchange contribution of the industry (i.e. its local payments) in the economy's total current receipts of foreign exchange.

The data show that the industry provided the bulk of incremental receipts in the period 1953 to 1958. After 1958, external receipts from other sources increased faster than bauxite receipts, so that the share of the latter in the total fell. The industry still makes a considerable contribution to the total foreign exchange supplies of the economy, though one that is much less than than suggested by its high share in the value of merchandise exports.

TABLE 40

FOREIGN EXCHANGE CONTRIBUTION OF THE BAUXITE/ALUMINA INDUSTRY. JE MILLIONS

Year	(1) Local payments of industry	(2) All other current foreign exchange receipts	(3) Total 1 + 2	(4) (1) as percent of (3)
1953	3.3	28.7	32.0	10.4
1954	2.6	31.0	33.6	7.7
1955	4.1	32.3	36.4	11.3
1956	4.5	35.5	40.0	11.3
1957	10.3	38.8	49.0	21.0
1958	11.9	39.5	51.4	23.2
1959	9.2	52.5	61.7	14.9
1960	12.2	64.1	76.3	16.0
1961	14.2	68.1	82.3	17.3
1962	14.7	65.5	80.2	18.3
1963	13.7	78.7	82.4	14.8
1964	15.4	81.7	97.1	15.9

Sources: Column (1) 1953-1958: See Girvan, N: op. cit. p. 153
1959-1964: National Income Worksheets
Column (2) Balance of Payments, Jamaica. 1958, 1959, 1963, 1964. This column includes all current visible earnings and net invisible earnings.

Contribution To The Local Economy: Inter-industry Linkages, Labour, and Government.

A deeper examination of the industry's contribution to the local economy is permitted by measuring the importance of its payments to the main recipients. Thus, the focus of attention here is the importance of the industry to domestic industry, to in the creation of labour income and of employment, and its contribution to Government revenue.

Inter-industry Linkages

The Jamaican economy, like most Hinterland economies, is characterised by low-productivity agriculture concerned mainly with the production of export staples and domestic foodstuffs, and a small manufacturing sector concerned mainly with the assembly of imported intermediates. The chief manufacturing industries based on indigenous inputs are sugar milling, cement, and the manufacture of building blocks.

In such an economic structure a "growth" sector such as bauxite can play a leading part in the development process through the growth in direct or induced demand for agricultural and manufacturing commodities. By providing a rapidly growing market for such commodities, a "growth"

sector can assist the establishment and expansion of capacity for their production. This will not only have direct income effects, but may give rise to external economies in the form of the provision of cheaper inputs by these industries to other domestic industries.

The bauxite/alumina industry in Jamaica, however, is marked by an extremely low degree of integration with the commodity producing sectors. Table thirty-seven shows the bulk of the local purchases of the industry is concentrated in the building construction and transport industries.

That the establishment of mining, transport, port, and beneficiation capacity provided a strong stimulus to the development of the construction industry in the 1950-1957 period seems clear. In this period investment in the industry was by far the most important single investment in Jamaica. Total capital expenditures in the eight years by the companies were J£ 46.2 million. If the local component in this total was forty percent,[42] then local capital expenditures would have been J£ 18.5 million.

In this period the construction industry experienced an unprecedented expansion. In real terms, the G.D.P. of the industry more than doubled in the four years between 1953 and 1957. The close connection between the level of investment in the bauxite industry was further demonstrated by the fact that in 1958, when the bauxite investment declined steeply, the level of activity in the construction industry actually declined in real terms. The low proportion of the total receipts of the construction industry derived from sales to the bauxite industry from 1959 through 1966, is probably due to the fact that this was a period of generally low construction activity in the latter.

The stimulation of a large increase in output and capacity in the construction industry must be credited to the bauxite industry as one of its principal beneficial effects on the national economy. This is all the more significant as, being locally-owned in large part, the profits of the construction industry accrue locally; being a labour-intensive industry, it creates much employment and labour income, and since it is based to a significant degree on indigenous inputs, it has substantial backward linkages with the rest of the economy.

Apart from building construction, however, the industry's links with the national economy are insignificant. Although a large part of its current purchases are from the transport industry, these do not form a significant share of the total sales of the latter. Moreover, both the capital assets of the transport industry (trucks, etc.) and its current inputs (fuels), have a high import-content.

The processes in the industry do not involve the purchase of agricultural inputs, but the companies have had to undertake farming operations. This followed from their legal obligations to maintain the land acquired by them in at least the pre-existing state of agricultural productivity, and to restore mined-out areas to their previous state of agricultural productivity. In 1957, a Ministry Paper published by the Government showed that the companies had improved the productivity of the lands occupied by them, and were engaged in the expansion of beef, pork and poultry production.[43] It is certainly the case that the companies have been responsible for a significant expansion of the beef herd in the island.

The data do not, however, permit a detailed assessment of the value of the agricultural operations of the companies over the whole

period. Since 1957, substantial acreages have been acquired by the companies, and virtually no information as to their utilisation is available. Much of the land purchased by the companies had previously belonged to large landowners, who had engaged in extensive cattle rearing with low cattle/land ratios and unimproved pasture. Thus, the maintenance of productivity would mean maintaining a low level of productivity, improving output or productivity would mean improving from a low base. Moreover, since the land is held principally for its bauxite deposits, a portion of it must always be held in preparation for mining, and long-term improvements on this portion would not be feasible. As the rate of production increased, so would the area earmarked for mining in the near future by each company. Finally, since the principal objective of the companies has nothing to do with the maximisation of the potential of the land, their farming operations are carried out in reality to meet the Government regulations, and for † public relations purposes. It is difficult, therefore, without firm supporting evidence, to make the assumption that production from this land is being maximised, even given the constraints imposed by the need to reserve a part of the land, at any given time, for mining proper. (In 1953, it was reported that twelve percent only of Aluminium Ltd.'s holdings of 30,000 acres contained bauxite, and only ten percent of Reynolds' 50,000 acres.)[44]

So far as the industry's effect on manufacturing industry goes, Table thirty-seven shows that only three to five percent of the total intermediate purchases of dried bauxite is spent on manufacturing inputs, and less than one percent for the multi-product operation.

At each stage of the industry the inputs required by the productive process increase substantially per unit of raw material processed. The importance of backward linkages with manufacturing, therefore, depend on (i) the extent to which processing takes place within the national economy, and (ii) the extent to which commodity inputs required by the processes are produced and supplied nationally.

Even where some local processing takes place, we have seen that the overwhelming majority of the commodity inputs required have been imported. This is in spite of the fact that for the chief input in the beneficiation process, caustic soda, national production is feasible.[45] As a result, the bauxite-alumina industry has provided virtually no stimulus for the development of manufacturing industry in Jamaica.

TABLE 41

INPUTS AND VALUE ADDED AT VARIOUS STAGES IN THE BAUXITE-ALUMINIUM INDUSTRY, AROUND 1963. JE

Bauxite Mining and Drying:	Value	Quantity Produced
Inputs	2.8	
Value Add3d	7.8	4.1
Gross Output	10.7	long dry tons
Alumina Manufacture		
Inputs[1]	11.6	
Value added	21.8	1.9
Gross Output	44.0	short tons
Aluminium Manufacture		
Inputs[2]	46.2	
Value added	69.5	
Gross output	159.8	1 short ton
Aluminium semi-fabricating		
Inputs[3]	82.3	
Value added	136.7	
Gross Output	382.7	1 short ton

Source: See Girvan N, "The Caribbean Bauxite Industry", p. 3

Notes: 1. Exclusive of bauxite
2. Exclusive of alumina
3. Exclusive of aluminium

Labour

As a result of the high capital/labour ratio employed in the industry, the amount of direct employment provided forms a very low proportion of the labour force, and the amount of wages paid out, a very low proportion of total wages paid out in the Jamaican economy.

Table forty-two shows that the total wage bill in the industry has formed a small proportion of total wages paid in Jamaica. The proportion has been rising, but only slowly, from around two to around three percent. There is, moreover, evidence that the growth of wages has not kept pace with the growth of physical output in the industry. Thus, between 1953 and 1954, the wage bill grew by two hundred and forty-one percent. The volume of bauxite output grew by two hundred and forty-one percent in the same period, but that of alumina output had grown over four hundred percent.

The total level of employment provided by the industry did not experience secular growth between 1958 and 1963, as shown in Table forty-two. Total employment provided is divided into "Mining and related" activities, which include the companies' agricultural operations,

TABLE 42

TOTAL WAGES AND SALARIES PAID BY THE BAUXITE-ALUMINA INDUSTRY AND PROPORTION OF NATIONAL TOTAL. J£ MN.

	Bauxite & Alumina	Percent Jamaican total
1954	1.1	1.7
1955	1.5	2.1
1956	1.7	2.0
1957	2.1	2.2
1958	2.6	2.5
1959	2.2	2.2
1960	3.0	2.6
1961	3.3	2.8
1962	3.9	3.1
1963	3.8	2.8

Source: National Accounts, Department of Statistics, Jamaica.

TABLE 43

EMPLOYMENT BY THE BAUXITE COMPANIES

	Total Employment	Mining and Related Activities	Construction
1958	4,700	2,600	2,100
1959	3,800	3,100	700
1960	3,100	3,000	60
1961	4,200	3,200	900
1962	4,000	3,300	600
1963	4,500	3,600	800

and employment in own-account construction, which varies with the amount of activity going on in the expansion of capacity. The effect of a rise in employment in "Mining and related" was eliminated, during this period, by the steep fall in employment in own-account construction consequent on the termination of the companies' large expansion programmes in the middle 1950's.

The industry thus does not employ a significant fraction of the labour force - 0.5 percent only in 1960; nor does it, in an economy with a severe shortage of employment opportunities, provide a source of direct incremental employment. In 1960, open unemployment in Jamaica was estimated by the Census to amount to 82,000 persons, some thirteen percent of the labour force. Net new additions to the labour force were estimated by the Government to run at an annual average of over 20,000 persons in the 1960-1970 decade. Thus, the growth of the labour force each year is over five times the total employment provided by the industry.

Moreover, there appears to be a distinct tendency for output in the industry to grow much faster than labour inputs. A study by H. Brewster estimated that, using the 1957 volume of output and of labour input as

the base, output in 1962 was one hundred and sixty-three, while labour input was one hundred and six. Labour productivity thus grew from a base of one hundred to one hundred and fifty-four.[46]

The evidence is that the industry creates far more employment outside of the national economy, in the elaboration of the ore, than within it. We estimate on the basis of labour/output ratios in the Jamaican alumina industry, and in the United States smelting industry, that the employment content of exported bauxite in 1964 was approximately 13,000 full-time jobs in beneficiating, and 50,000 full-time jobs in smelting. This, of course, excludes the employment created in semi-fabricating, and in the production of inputs for these processes, and the indirect employmemt created out of the expenditure from the labour incomes.

Tax revenue.

The relatively small amount of intermediates purchased and wages paid by the industry means that, so long as the institutional and technical conditions of the industry remain unchanged, the item which critically influences the Local Share is the level of tax revenues. But there is a sense in which this item is the most problematic of all, from the point of view of the Caribbean country.

Since the dried bauxite ore is transferred from branches of the vertically integrated MNCs in Jamaica, to other branches in the United States for beneficiation, there is no market transaction involved. To tax the bauxite-exporting operation, the Government and the companies must agree on a system of imputing a notional value on the ore. In this process, the Government is at a distinct disadvantage. The paucity of commercial transactions in bauxite anywhere in the world means that there are few "reference" prices which can be used as guidelines; the fact that bauxite are not homogenous means that ores with which Jamaican ore could possibly be compared is of different chemical composition. Most of the technical information which could help the Government to negotiate adequately with the companies, is controlled by the companies themselves.

These disadvantages were clearly demonstrated by the low tax "take" yielded by the first (1950) agreement between the Government of Jamaica and the companies.[47] Tax payments by the companies were divided

into royalties and income tax. The following were the features of the agreement:

(1) Royalties: On bauxite exported after drying only, one shilling per long dry ton.

On bauxite processed into alumina within Jamaica, tenpence per long dry ton.

(2) Income Tax on bauxite exported: a "notional" profit of U.S. $.60 per long dry ton was agreed upon. At the Jamaican rate of company income tax of 40 percent, this yielded U.S. $.24 (one shilling and eightpence) per ton.

(3) Income tax on bauxite processed into alumina.

The normal method was used of deducting production costs from the value of "sales". Since alumina is homogenous, and trade comes closer to commercial transactions, the area of doubt over alumina values is relatively small.

The arrangements for bauxite exports therefore yielded a total tax take of two shillings and eightpence per ton. There is little doubt that this was an unnecessarily low payment; in 1950, for example, the Government of Surinam received U.S. $2.04 - over fourteen shillings - per metric ton

exported. That the companies were able to concede such a low tax payment demonstrates the strength of their bargaining position. In fact they argued that the quality of Jamaican bauxite is inferior to that of Guyanese and Surinam bauxite.[48] As we have already pointed out, Jamaican bauxite is characteristically of a lower alumina content than "Surinam-type" ore. But it is also of a lower silica content, which facilitates high recoveries of the alumina present. Moreover, there is little doubt that Jamaican bauxite is cheaper to mine than Guyanese and Surinam ores, because of the small amount of overburden. It is also probably cheaper to ship to the United States, because of the shorter distance and the fact that transshipment facilities, which were necessary for the ore shipped from the Guyanese, and which were established by the companies at Chaguaramas in Trinidad off the South American mainland, were unnecessary in the case of Jamaican bauxite. It would seem, therefore, that the companies' virtual monopoly over technical information was used by them to good advantage in this agreement.

Another aspect of the 1950 agreement was the special arrangements for income taxation on bauxite exports, embodied in (2) above. Since the arrangement resulted in a fixed income tax payment per ton, it was similar to a royalty; but it had the charac-

teristics of an income tax in that its original level was conceptually related to a 'price' of bauxite minus the cost of producing it. The effect of the arrangement was, however, that changes in production costs or in the value of bauxite did not affect the tax payment in any way. If costs are rising or the value of the product falling, this is favourable to the Government. But if the value of the product is rising relative to costs, additional taxable profit escapes the Government's take. No data is available on the movement of production costs for the bauxite-exporting operations in this period, but it is certain that aluminium and bauxite prices in the U.S. industry were rising steadily between 1950 and 1956.

TABLE 44

PRICE INDICES FOR THE UNITED STATES ALUMINIUM AND BAUXITE INDUSTRY, AND JAMAICA, 1950-1956.

YEAR	UNITED STATES		JAMAICA	
	ALUMINIUM PRICES	BAUXITE	BAUXITE PRICE	INCOME TAX
1950	100.0	100.0		
1951	107.3	100.6		
1952	109.6	111.5	100.0	100.0
1953	118.1	128.1	100.0	100.0
1954	123.2	154.3	100.0	100.0
1955	133.9	126.0	100.0	100.0
1956	146.9	126.4	100.0	100.0

Sources: Calculated from data in U.S. Bureau of Mines, Minerals Year book. The United States price of bauxite refers to crushed and dried ore.

In this period U.S. primary aluminium prices grew steadily, by 47 percentage points. Bauxite prices in the United States grew to a high in 1954, and declined thereafter, but in 1956 were still 26 percentage points higher than in 1950. In the first four years after production began in Jamaica, however, both the imputed price and the total tax paid remained the same, under the arrangements.

In 1956 the Government engaged a consultant and began negotiations with the companies towards a revision of the agreement. Although only that part of the agreement relating to royalties was due for revision, the Government was able to renegotiate the income tax agreement as well. The following were the features:[49]

(1) Royalty

(i) On bauxite exported after drying only: four shillings per ton where the company's production for the year is less than one million tons, three shillings per ton where production is over one million tons, and two shillings per ton on additional production after two million tons.

(ii) On bauxite processed into alumina locally:

two shillings and sixpence on the first million tons, two shillings on the second million, and one shilling and sixpence on the third million.

(2) Income Tax:

(i) On exported bauxite: the notional profit was revalued to U.S. $3.85, yielding $1.54 in income tax at the 40 percent tax rate.

(ii) On alumina: as before, i.e. value minus costs.

(3) "Escalator" Clause:

One half the royalties and income tax paid on exported bauxite to vary directly with the price of aluminium pig of 99 percent average guaranteed purity as quoted in New York by the "American Metal Market". The base price was the price ruling at the time of the agreement in March 1957: U.S. $.25 per lb. The effect of this clause is that for each 1 cent variation in the price of aluminium pig the Government's revenue varies by 3.36 pence

per ton of bauxite exported.

The net effect of the new agreement was that on exported bauxite the Government's take was raised from two shillings and eightpence (2/8d) per ton to a base of about fourteen shillings (14/-) per ton. In addition there were clauses designed to (i) increase the Government's take if the price of aluminium rises, and decrease the companies' liability if the price fell, (ii) encourage higher production of bauxite through a regressive royalty structure, and (iii) encourage the local processing. We shall examine the effect of the escalator clause in brief.

The "Escalator" Clause.

In tying one-half of the total tax payments on exported bauxite directly to the price of aluminium, the Government of Jamaica was influenced by the fact that aluminium prices had been rising during the period of the original agreement, without any corresponding rise in bauxite income taxes. Between 1946 and 1956 the average annual increase in the price of pig had been 1 cent per lb. The Government, in its Ministry Paper, clearly expected that this rate of increase would continue, so that its tax take per ton of bauxite would rise over time.[50]

This did not, in fact, take place. The base price of

25 cents per lb. ruling at the time of the agreement turned out to be represent a peak in the aluminium price. Since that time the price has weakened slightly, and fluctuated at between 22 cents and 25 cents per lb.

TABLE 45

PRICE OF ALUMINIUM PIG OF 99 PERCENT AVERAGE GUARANTEED PURITY QUOTED IN NEW YORK BY THE AMERICAN METAL MARKET.

Date of Effect	Cents per lb.	Price Index
March 1957	25.0	100.0
April 1958	24.0	96.0
August 1958	24.7	98.8
December 1959	26.0	104.0
September 1961	24.0	96.0
December 1962	22.5	90.0
October 1963	23.0	92.0
March 1964	23.5	94.0
June 1964	24.0	96.0
December 1964	24.5	98.0

Source: Government of Jamaica, Economic Survey, various years.

As Table 45 shows, for most of the period since the agreement the price of pig has been below the base price. Most of the price increases in the post - 1945 period had taken place during the Korean War, when a situation of large excess demand prevailed. During this time an enormous amount of new capacity was built. Moreover, in 1954 and 1955 all three aluminium majors embarked on further programmes of expansion of capacity. But with the termination of the Korean War, and the 1957 and 1960 recessions in the U.S. economy, the consumption of aluminium hardly increased in the U.S. between 1956 and 1960. The stabilisation of the level of consumption coincided, in the latter part of the 1950 decade, with the completion of substantial new production capacity by the companies. The result was the emergence of substantial new excess capacity.

Prices, therefore, which has risen between 1950 and 1956, weakened between 1957 and 1962. Although consumption recovered after 1960, prices rose only slowly because production did not reach full capacity until 1964.

As it happened, the new agreement between the Government of Jamaica which used a 'base' price, and the companies was made at a time when the price was at a peak. Thus, when bauxite

taxes were not tied to the price of aluminium, the price of aluminium was rising; when taxes were tied to the aluminium price, the price weakened.

The escalator clause, moreover, did not account for rises in the notional profit of bauxite which might be caused by factors other than a rise in the price of aluminium. Such might be the case if the notional price of bauxite were to rise for reasons other than a rise in the price of aluminium. This could result from any of three causes. There may be a fall in the cost of transporting the ore from mine to plant, or an improvement in the quality of the bauxite mined, or an improvement in the beneficiation process which increases the recovery of alumina from the ore. In fact, an examination of the values used for Jamaican bauxite by the U.S. Bureau of the Census, shows that these values have not only been above the prices negotiated between the Jamaica Government and the companies but that they have been rising steadily over time. These values are supplied by the companies.

Between 1957 and 1964 in spite of the stabilisation of aluminium prices, the recorded prices of all bauxites used in the United States increased. Thus, for example, the average value of domestic ore increased from J £ 4.34 between 1957 and 1963; and the average value of all imported bauxite rose from J £ 4.52 between 1957 and 1964.

It is possible to calculate the additional export value of Jamaican bauxite under the assumption that the U.S. valuation had been used rather than the Jamaican negotiated price. The results of this calculation are shown in Table 46. In brief, the additional export value which would have been realised, in the 1953-1964 period, amounts to approximately 51 percent of the actual export value resulting from the use of the negotiated price; the additional taxes realisable, on the assumption that the whole additional value represents additional taxable profit, amounts to 58 percent of the actual tax revenue paid over this period.

Bauxite revenues and public expenditure.[51]

In spite of its defects, the fact that the 1957 agreement raised the tax take from exported bauxite more than fivefold, the substantial secular rise in exports, and the coming into operation of the new alumina plant in 1960, transformed the industry into a major taxpayer.

TABLE 46

AVERAGE F.O.B. VALUE AT PORT OF SHIPMENT, OF U.S. IMPORTS OF JAMAICAN BAUXITE, COMPARED TO PRICES NEGOTIATED BETWEEN THE COMPANIES AND THE GOVERNMENT OF JAMAICA.

J£ PER LONG DRY TON.

YEAR	(1) U.S. VALUATION	(2) JAMAICA NEGOTIATED PRICE	(3) DIFFERENCE (1 - 2)	(4) ADDITIONAL VALUE J£ 000	(5) HYPOTHETICAL ADDITIONAL TAXES J£ 000
1953	2.66	1.79	0.87	1023	409
1954	2.62	1.79	0.83	1434	574
1955	3.02	1.79	1.23	2672	1069
1956	3.26	1.79	1.47	3785	1516
1957	3.31	2.63	0.68	2476	990
1958	3.37	2.63	0.74	3551	1420
1959	3.40	2.63	0.77	3232	1293
1960	3.39	2.63	0.76	3153	1261
1961	3.38	2.63	0.75	3731	1493
1962	4.49	2.63	1.86	11136	4454
1963	4.93	2.63	2.30	11823	4749
1964	5.02	2.63	2.39	14261	5704
TOTAL				58596	24932

Sources:
Column (1) U.S. Bureau of Mines Minerals Yearbook.
Column (2) Jamaica, External Trade.
Column (4) Bauxite exports multiplied by the difference between the U.S. valuation and the Jamaica negotiated price.
Column (5) 40 percent of Column (4)

Before 1957 the industry's tax payments averaged only 5 percent of its total local payments; after 1957 they averaged 42 percent. Before 1957 the industry's tax payments financed just over 1 percent of Government expenditure, after that year they financed between 12 and 18 percent.

TABLE 47

BAUXITE REVENUES AND PUBLIC EXPENDITURE

YEAR	BAUXITE REVENUES J£ MN.	(1) PERCENT GOVT. EXPENDITURE	GOVT. EXPENDITURE PERCENT GROSS NATIONAL EXPENDITURE	GOVT. INVESTMENT PERCENT GROSS DOMESTIC INV.	GOVT. CONSUMPTION PERCENT TOTAL CONSUMPTION
	(1)	(2)	(3)	(4)	(5)
1953	0.04	0.3	11.4	14.2	9.8
1954	0.1	0.7	10.3	10.0	9.5
1955	0.3	1.6	10.3	9.3	9.8
1956	0.3	1.5	10.7	7.5	11.0
1957	2.3	9.3	11.3	11.1	11.0
1958	2.6	17.8	11.6	10.8	10.9
1959	3.9	12.4	13.7	12.2	10.9
1960	5.6	16.5	13.8	10.7	11.1
1961	6.8	18.2	14.4	11.4	11.8
1962	6.5	15.5	15.6	10.8	12.5
1963	5.9	13.6	15.4	9.8	12.7

Sources: Extracted From National Accounts.

In the early 1950s Government spending contributed only around 10 percent of total national expenditure. The tax base was narrow and small, and the bulk of finance for "Development Expenditure came from U.K. Government grants and borrowing. In 1957 the Government instituted a new Ten Year Plan of Development, which trebled the rate of Development Expenditure. At the same time the burden of financing such expenditure was shifted from U.K. Government grants partly to Government saving realised through an excess of recurrent revenue over recurrent expenditure. Thus, while the former financed 31 percent of Development expenditure in the 1946-1957 period, its share fell to 5 percent only for the next six years; the share of Government saving in Development finance increased from 31 percent in the 1946-1957 period to 44 percent over the next six years.

Higher bauxite revenues were the critical factor permitting the higher share of Government saving in financing Development expenditure, and thereby the enlarged role of the public sector in the national economy. In the 1957-1963 period, bauxite revenues amounted to over J £ 28 mn., while the total contribution of Government saving to Development expenditure was J £ 24 mn. Bauxite revenues were therefore covering a part of recurrent expenditure as well as financing the Government's current contribution to Development spending.

The higher and growing level of public expenditure gave rise to a significant increase in the role of Government in the national economy. Government expenditure became an instrument of the implementation of an active policy designed to promote economic development through the provision of infrastructure to enhance the 'climate' for private investment, particularly private foreign investment. Government expenditure, moreover, became an important component of total demand. The share of Government spending in total Gross National Expenditure increased steadily from around 10 percent in the early 1950s to over 15 percent in the early 1960s. This was the period in which bauxite revenues became an important component of Government current revenues, and was the single most important incremental contributor to them.

The Government's contribution to capital formation nonetheless remained disappointing. After a rise in the level from J£ 2.9 in 1956 to J£ 5.9 mn. in 1957, the level declined slightly over the whole of the next six years. The share of Government investment in total investment increased from 7 to 12 percent between 1956 and 1959, but after that year the share fell, as private investment increased while the level of Government investment did not. In fact,

the item of Government expenditure to increase fastest during this period was transfer payments.

Moreover, the trend for growing financial self-reliance based on bauxite revenues which seemed to be manifesting itself in the 1957-1963 period was reversed subsequently. In the Five Year "Independence" Plan announced for the 1963-1968 period the rate of Development expenditure was beginning to increase at a higher rate than recurrent revenue, because of the effect of the recurrent costs of the capital expenditures incurred under the previous Development programmes. A higher projected annual level of Development expenditure, therefore, coincided with a falling level of Government saving. Thus the Plan's contemplated financing threw the burden on borrowing and foreign economic aid.

TABLE 48

FINANCING OF JAMAICA GOVERNMENT DEVELOPMENT PROGRAMMES.

	Total ₰ 000	----- Percent Total ----- Government Saving	Borrowing	Foreign Aid
1946-1957 Plan: Actual	18294	31	36	31
1957-1963 Plan: Actual	55570	44	51	5
1963-1968 Plan: Planned	91351	19	47	33

Sources: Government of Jamaica Estimates, and "Five Year Independence Plan, 1963-1968, Kingston, 1963.

Bauxite revenues, then, were not necessarily used by the Government to finance an ever-growing contribution to capital formation. Through its contribution to a rapidly growing level of Government consumption and transfer payments, the bauxite industry financed a large part of incremental money demand in the economy. But, in an economy where the propensity to import is high and the elasticity of domistic output is low as in Jamaica, increases in money demand are of far less critical significance than increases in domestic capacity. Moreover, although bauxite revenues have grown rapidly since the

1957 agreement, their very abundance set up pressures for an ever-growing level of Government Development expenditure. These pressures have proven impossible to relieve by dependence on bauxite revenues for the bulk of finance. Government plans for Development expenditure have outstripped the growth of bauxite revenues. The result has been an increase in the rate of borrowing. Thus the Public Debt, for example, which stood at J £ 18 mn. in 1956, had grown to over J £ 50 mn. in March 1964.

Bauxite and Economic Growth: The response of the domestic economy.

Investment in the bauxite industry was the single largest investment in Jamaica between 1950 and 1957, and after 1957 the industry provided the largest single source of tax revenue. The response of the Jamaican economy to these large injections of expenditure affords considerable insight into the effect of the industry on the rate and pattern of economic growth.

The period of large bauxite investmement was associated the highest growth rates achieved by the Jamaican economy. Thus in the seven years after 1950 the Gross National Product in current prices grew at an annual average of 13 percent. This was a direct result of the rapid growth of the mining and construction sectors resulting

from the establishment of the bauxite industry. The shares of these two industries together in the Gross Domestic Product in 1953 prices grew from 11 to 22 percent in the space of the four years between 1953 and 1957.

In the 1958 to 1963 period a steep fall in the level of bauxite investment was associated with a steep fall in the overall rate of growth . Thus, the annual real increase in the G.N.P. for these years averaged only one-half the average for the 1953-1957 period. While the mining sector's G.D.P. continued to grow, capital investment in the industry fell to very low level. The chief form of local income creation by the industry now became tax payments, following the 1957 agreement. The public sector, financed heavily by bauxite revenues, now assumed the role of the leading sector in the growth process. But this sector's effectiveness in this respect was attended by severe limitations. Government investment in 1958 had increased by nearly J £ 3 mn. above the 1957 level, but bauxite investment had declined by J £ 6 mn. In the following years the latter was to decline even further while Government investment failed to increase. Government incremental expenditure was rather upon transfer payments and consumption. Thus, although the

public sector increased its share of the G.D.P. after 1958, and public expenditure grew faster than private expenditure, the overall rate of growth was considerably below that of the earlier period.

This process is reflected in the structure of investment, savings, and the balance of payments during this period. In the period of heavy bauxite investment total Gross Domestic Investment in Jamaica was lifted more than sevenfold, from J £ 8 mn. in 1950 to 57 mn. in 1957. The chief contributors to this were investments in mining, and in such ancillary industries as construction and transport.

The completion of bauxite investments in 1957 resulted in the fall in 1958 and thereafter in capital formation in mining and the service sectors ancillary to mining. Investment in the other primary commodity producting sectors in the economy, agriculture and manufacturing - failed to grow. Bauxite has few linkages with these sectors, so that the industry failed to transmit its expansion directly to them. Under these conditions, the effects of the industry could only be felt indirectly, through the actions of Government in attempting to promote the growth and diversification of agricultural and manufacturing output. The poor performance of these sectors indicate the Government's failure to identify and remove the main

bottlenecks to their development. To some degree, the external diseconomies of the bauxite industry contributed to the continuing underdevelopment of the agricultural and manufacturing sectors, in ways discussed in the essay on "The New Mercantilism".

In the absence of any significant growth in investment in the agricultural and manufacturing industries, the decline of bauxite and ancillary investment was partly "cushioned" by the growth in public investment and investment in residential buildings. Public investment, however, is mainly on infrastructural works such as roads and public buildings. It had a direct effect on income and employment creation, but at best an indirect effect on economic growth. The same applies to investment in residential buildings.

Moreover, in spite of a significant growth in per capita income, the economy has continued to rely heavily on foreign capital to finance its investment. Although foreign investment in the mining industry fell after 1957, substantial inflows of capital took place through the banking, finance, and public sectors. Capital inflows, which had contributed 41 percent of the finance for Gross Domestic Investment in 1957, still contributed between 25 and 35 percent in most of the following years. These inflows, in addition, were associated with relatively non-productive uses

within the domestic economy. The inflows of bank credit and hire purchase finance took place under circumstances in which the community's growing propensity to spend, together with the termination of the bauxite investment, gave rise to a rapid growth of borrowing from the commercial banks relative to bank deposits. In order to accomodate this process the banks ran down their overseas balances and engaged in substantial foreign borrowing. This facilitated a process whereby personal consumption expenditure grew relative to personal disposable income, and personal savings fell. Capital inflows through the banking system thus subsituted for, rather than supplemented, national savings.

In the public sector the growth of foreign borrowing was associated with a steady decline in Government saving after 1957. This was due to the rise in recurrent spending relative to recurrent revenue. Thus in this sector as well, capital inflows tended to substitute for national savings rather than supplement them.

In the country's foreign trade, there were hardly any new commodity exports other than those of the bauxite industry. The main additional source of foreign exchange in the period, other than bauxite and alumina, was the growth of the tourist industry. Like

bauxite, however, this industry is to a large degree foreign-owned, has a high (38 percent) import-content, and is heavily dependent on foreign demand.

In merchandise imports, the share of consumer goods was the same, in the 1960-63 period, as it had been before the period of bauxite investment. The share of capital and intermediate goods had increased from 54 to 62 percent between 1954 and 1957, but the failure of substantial new productive investments to take up where bauxite had left off, was reflected in an absolute fall in the share of both right up to 1963.

The economy therefore remains dependent on a narrow range of exports for its main sources of income generation, on capital inflows for the finance of its investment, and on imports for a large proportion of its supplies.

Bauxite and economic growth: Integration and fragmentation.

The most important structural feature of the bauxite - alumina industry, and the one that explains its significant economic effects on the economy, is the fact that it is composed of a small number of firms each of which is integrated with a Multinational corporation, Each M.N.C. has a complex of production facilities all

over the world, and carries out decision-making in its metropolitan Head Office.

Since each unit is institutionally integrated, by commodity, capital and technology flows, and by the flow of decisions, with an overseas M.N.C. , it follows that each unit is institutionally divorced from every other unit in the industry, and from the Local Government. The fragmentation of the industry, within the national economy is the corollary of the vertical integration of each of its units with an M.N.C.

In Jamaica, the results of this are manifold, and far-reaching in their effects. Each company owns and operates its own mining, drying, transport, port, harbour, and shipping facilities. Each one mines its deposits at a rate dictated by the multinational raw material strategy of its parent. Each ships its ore to processing plants owned by its parent.

From the national point of view, the nature and pattern of resource use resulting from this process is not necessarily the optimal. In fact, since each unit in the industry is an instrument for the optimisation of resource use of its M.N.C., with its worldwide spread of resources and production facilities, it would be a purely fortuitious

accident if the sum result was an optimum allocation of resources for the national economy.

To have five different and separate facilities for mining, transporting, drying and shipping bauxite may, for example, represent an uneconomic use of capital from the national point of view. Nationally, this may involve a duplication of facilities which may be unnecessary were bauxite production to be consloidated within one area of the country, with shipment from one or two ports. To the companies of course, such a pattern of development would not be consistent with the requirements of vertical integration that each company own, work, and ship its own bauxite independently of all others.

To locate production in one area of the country at a time, might also serve as an instrument for the maximisation of the agricultural potential of bauxite lands. For example the companies have engrossed large acreages in St. Ann, Manchester and St. Elizabeth for mining purposes or for reserves. If production for the country as a whole were concentrated in one parish at a time, then production could take place (say) in St. Ann for twenty years, while bauxite lands in Manchester and St. Elizabeth are devoted to long-term

crops. When St. Ann's reserves are exhausted, production could move (say) to Manchester, and the restoration of mined out areas in St. Ann begin, and so on. In other words, national needs might require a policy of optimising the use of the country's limited land resources for both bauxite and non-bauxite purposes.

Another policy which might be served by the adoption of a national production policy is that of the desired rate of reserve depletion. The high rate of exploitation of reserves adopted by three of the four companies operating in Jamaica is not necessarily desirable from the national point of view. For it implies a shortening of the life of the industry, which may not be necessary to acquire the desired level of income creation yielded by the industry. For example, since the local payments per ton of ore processed into alumina locally is three times the local payments per ton of ore exported, the same local payments could be yielded by producing and processing locally one third the current level of exports. Thus, a national production and processing policy would open up options for maximising the income yielded by the industry without sacrificing the length of its life, by adding value to bauxite through processing.

Needless to say, such options are not open to the

national economy under conditions of multinational ownership. It would not be probable, for example, that Kaiser would sell ore mined in Jamaica to Aluminium Ltd's alumina plant in Jamaica, while excess capacity existed in Kaiser's own alumina plants in the United States, and alumina was required by Kaiser's smelters. And even in Kaiser were willing to sell Jamaican ore to Aluminium Ltd., the latter may not be willing or able to buy, as its own alumina plant will have been established in balance with the capacity of its own bauxite mines in Jamaica. The use and disposition of bauxite from the national point of view therefore, runs completely counter to the corporate use of the resource.

Finally, the fragmentation of the industry intra-nationally and its integration with overseas M.N.C.s divorces the use of its capital from the process of national resource allocation. The profits and depreciation funds generated by the industry are available to the M.N.C.s which own each unit. These funds are used to finance the growth, diversification and elaboration of the firm as a whole. They may, for a time, be used to expand operations in Jamaica or any other Hinterland country in which the M.N.C. has an operation. But they will also contribute to a corporate pool funds upon which the firm draws to finance the process of elaborating Jamaican raw material in other countries, of "shifting terrain" eventually, from Jamaica, as other countries'

resources are opened up, and of shifting out of the commodity entirely and into some new commodity created by the continuing advance of technology. The funds, therefore, apart from tax revenue, do not become a part of the national pool of savings, from which the national economy can draw to finance its own growth and diversification, and which can be used to develop other industries in anticipation for the time when secular stagnation of the resource industry sets in.

NOTES

1. In 1854, for example, Emperor Napaoleon III of France gave generous financial support for research into an economical method of aluminium prodiction, because of its military potential. See D.H. Wallace, Market Control In The Aluminium Industry. Harvafd, 1937 p. 3.

2. See Wallace, op. cit. Appendix A, for detailed description of the early history of scientific discovery and invention related to aluminium, and the repercussions of this work in other branches of electrochemistry.

2. For a description of early methods of preparing aluminium compounds for reduction, see J.W. Richards, Aluminium. Philadelphia: Henry Carey Baird and Co., 1890. Chapter VI.

4. The following account of the roles of the electricity and auto industries in the demand for aluminium draws heavily on the discussion by Wallace, op; cit, pp. 14-23.

5. See U.S. Bureau of Mines, Mineral Facts and Problems, 1965. p. 25.

6. Huggins, op. cit. p. 82.

7. Wallace, op. cit. p. 6. The account of the history of Alcoa up the Second World War draws heavily on Wallace's work.

8. See Wallace, op. cit. p. 11.

9. In the 1920s, for example, the share of Alcoa's sales made in forms other than ingot and sheed varied between 29 and 40. Ibid. pp. 251-252.

10. Ibid. pp. 250-252.

11. Up to 20,000 kwh are consumed per short ton of metal produced.

NOTES

12. See M.J. Peck, Competition In The Aluminum Industry, 1945-1958. p. 86.

13. For a detailed description of the events leading up to Alcoa's capture of the rich potential of the Saguenay River, see Wallace, op. cit. pp. 73-75, 129-137.

14. Ibid. p. 137.

15. Ibid. pp. 183-186.

16. Ibid. p. 141.

17. Ibid, p. 142.

18. Wallace, op. cit. p. 69 referring to an article by L. T. Emory "Bauxite Deposits in British Guiana", Engineering and Mining Journal, April, 1925.

19. See Wallace. op. cit. p. 70.

20. Ibid, pp. 69-70, 130-132.

21. Ibid. p. 188.

22. Ibid, p. 141.

23. Wallace, op. cit, pp. 115-116.

24. Ibid. p. 76.

25. Ibid. p. 76.

26. Ibid p. 75.

27. Peck, M.J. Op cit. p. 13.

NOTES

28. See Peck, M.J. Op. cit. pp. 5-14.

29. Ibid. pp. 19.

30. Ibid. pp. 147-154 and Girvan, N. Foreign Investment And Economic Development In Jamaica Since The Second World War. Ph.D Thesis (Unpub.) London University, 1966. pp. 115-117.

31. Sources: Minerals Yearbook, various years. See also Girvan, N: Foreign Investment. pp. 123-125, 129-131.

32. Sources: as above.

33. See United States Bureau Of Mines, Minerals Yearbook, 1950 and 1951, Chapters on "Bauxite".

34. For the period up to the Second World War, the analysis is based chiefly on Wallace, op. cit., for the period since, the U.S. Bureau of MinesAnnual Minerals Yearbook, Chapters on "Aluminum", and on "Bauxite", was the main source of information. See also Huggins, op. cit., and Girvan, Foreign Investment. and The Caribbean Bauxite Industry.

35. Note: except where otherwise stated, aluminium and alumina quantities in this paper are given in short tons (2000 lbs.) and bauxite quantities in long dry tons (2240 lbs.) When these quantities are used, the ratio of bauxite to alumina to aluminium is approximately 4.1 : 1.9 : 1.

36. Peck, M.J. op cit p. 86.

37. Alcan Aluminium Ltd. Alcan in British Columbia Montreal, 1966.

38. Zans, op. cit. pp. 322 - 329.

39. Ibid p. 329.

NOTES

40. Ibid. p.322

41. The following descriptions of the initial operations of the companies is based on the account given in Zans, op.cit.

42. See Sable.

43. Government of Jamaica: Ministry Paper No. 20, July 2, 1957. Published by the Jamaica Agricultural Society.

44. Zans,op. cit. pp. 324, 325.

45. See Brewster, H. and Thomas, C.Y.: Dynamics of West Indian Economic Integration I.S.E.R. 1967.

46. Brewster, H: The pattern of wages, prices, and productivity in Jamaica, 1957 to 1962. (Mimeo. 1965) p.20.

47 Contained in Message No. 35 of 1950 from the Governor to the House of Representatives.

48. Hicks, J.R. and U.K. : Report on Finance and Taxation in Jamaica. Kingston, the Government Printer, 1955.

49. See Government of Jamaica: Ministry Paper No. 2, 1957.

50. See Ministry Paper No. 2, 1957, (cited)

51. The data quoted in the test of the following section are drawn mainly from National Accounts, Dept. of Statistics, Kingston.

A COMPARATIVE ANALYSIS OF THE VARIOUS CAPACITY TO IMPORT MEASURES FOR TRINIDAD AND TOBAGO

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The Structure of Trade of Trinidad and Tobago

By and large, Trinidad and Tobago is a typical Caribbean economy with a plantation history. There exists a long-standing legacy of structures making for firmly established patterns of production and trade based mainly on the sugar industry and a few other agricultural exports. During the nineteenth century, some diversification of output took place away from sugar and towards other agricultural products such as bananas, cocoa, citrus and coffee. The base of the economy was later expanded by the discovery of petroleum. During and after World War II, significant changes occurred in public economic policy as more executive power was gradually transferred to the Government of the island and some impetus was given to the promotion of small-farm residentiary agriculture. This has contributed to further diversification of the economy.

The export sector, though very large relative to national product, comprises few products, some of which are sold in tenuously held and protected metropolitan markets; this is the case particularly with sugar and fruits. The main export, petroleum and its products, are the most important single source of foreign earnings and government revenue.

Table 1 shows the exports of goods and services by Trinidad and Tobago as a percentage of Gross Domestic Product for the period 1954 to 1964. The Table illustrates the importance of foreign trade in the economy of the country, with approximately 70 per cent of G.D.P. being exported. For purposes of comparison, the value of exports of goods and services as a percentage of Gross Domestic Product for a number of selected countries are presented in Table 2 for the year 1960.

A comparison between Tables 1 and 2 shows that the ratio of exports to G.D.P. is higher for Trinidad and Tobago than for any other country examined.

THE CAPACITY TO IMPORT

TABLE 1

TRINIDAD AND TOBAGO

Exports as a Percentage of G.D.P. (at factor cost) for the Period 1954 to 1964

W.I. $ Million

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
G.D.P. at factor cost	404.2	469.0	556.3	659.1	719.4	799.1	865.9	954.8	1005.7	1037.2	1076.7
Exports of Goods and Services	292.7	318.9	370.6	445.0	482.0	506.5	551.7	697.7	699.2	746.7	780.4
Exports as a Percentage of G.D.P.	72.4	68.0	66.6	67.5	67.0	63.4	63.7	73.1	69.5	72.0	72.5

Source: Annual Statistical Digest, Central Statistical Office, Trinidad and Tobago.

TABLE 2

Exports as a Percentage of G.D.P. for
Selected Smaller Countries for the Year 1960

Country	Monetary Unit	G.D.P. at Factor Cost	Exports of Goods and Services	Exports as a Percentage of G.D.P.
Barbados	W.I. $ Million	106.5	55.7	52.3
Belgium	Belg. Francs milliards	506.7	190.4	37.6
British Guiana	W.I. $ Million	242.9	142.5	58.7
Canada	Can. $ Million	32,363.0	6,691.0	20.7
Denmark	Kr. Million	40,517.0	13,468.0	33.2
Finland	Markkas Million	12,246.0	3,712.0	30.3
Jamaica	£ Million	230.7	73.1	31.7
Mauritius	Rupees Million	549.0	167.0	30.4
Panama	Balboas Million	391.0	123.9	31.7
Puerto Rico	U.S. $ Million	1,641.3	843.1	51.4
Tanganyika	£ Million	186.2	58.9	31.6

Source: U.N. Yearbook of National Account Statistics, 1963.

Its dependence on this narrowly based foreign trade makes the economy extremely vulnerable to changing external conditions. Moreover, during the decade covered by this study, both exports and imports grew faster than Gross Domestic Product, thus increasing the orientation of the economy towards foreign trade.[1]

The distribution of resources is highly skewed, a fact which is reflected in the structures of production and trade of the country. This is revealed by Table 3 which shows the percentage contribution of the major sectors to G.D.P. and to aggregate exports for the year 1961.

TABLE 3

TRINIDAD AND TOBAGO
Percentage Contribution of Major Sectors
to G.D.P. and to Exports in 1961

Sector	Percentage contribution to:	
	real gross domestic product at factor cost [a]	exports of goods and services [b]
Agriculture	12.1	2.0
Oil and Asphalt	32.0	73.6
Sugar	2.0	6.8
Other Manufacturing	10.6	1.6
All Other	43.3	16.0

Sources: a - F. Rampersad, Growth and Structural Change in the Economy of Trinidad and Tobago 1951-1961, Central Statistical Office, Government of Trinidad and Tobago, Research Papers, Number 1, December 1963.
b - Compiled for this study from External Trade Statistics.

Table 3 clearly shows the importance of the petroleum sector in the economy; it contributes about one third to G.D.P. and over 70 per cent to exports. It should be noted that the low share of agriculture does not signify a high degree of transformation since approximately 21 per cent of the population were still employed in agriculture in 1960.[2] Rather, it reflects the low productivity levels in this sector which cannot support the home food market even while specialized agricultural exports - including sugar - are suffering from depressed world market prices and conditions of oversupply.

Although manufacturing other than the processing of sugar and of minerals "..... has attained fairly respectable levels in Trinidad and Tobago (12.6 per cent of G.D.P.)",[3] exports of this sector are still low. The new products being manufactured in the island are import-substituting. Although small in value relative to traditional exports, manufacturing exports have increased rapidly since 1964 with the expansion of the petro-chemical industry. It is to be noted, however, that the petro-chemicals, according to the criteria of classification employed in the Accounting Framework, properly belongs in the petroleum industry.

On the import side, crude oil for petroleum refining accounts for about 50 per cent of total imports, manufactured goods for another 20 per cent and food, drink and tobacco combined for approximately 14 per cent. [4]

The Terms of Trade

The terms of trade have been moving against Trinidad during the decade covered by this study. During the post-war period, such a trend has been experienced by most countries which exchange primary products - showing declining price levels - against highly manufactured goods - with rising prices. The price indexes of exports and imports as well as the terms of trade of Trinidad for the period 1954 to 1964 are shown in Table 4.

If exports were the only means of paying for imports, a sustained decline in the terms of trade over a period of years would inevitably force either a reduction in the volume of imports or a slower rate of growth of imports than of exports. However, while the volume index of exports rose from 100 in 1951 to 220.9 in 1960, the volume index of imports rose from 100 in 1951 to 212.7 in 1960.[5] With declining terms of trade and the quantity of imports still increasing as fast as the volume of exports, it is obvious that financing from external sources must have played a major role in securing the high level of imports of the country. A comparative analysis of the various measures of the capacity to import employed in this study particularly with respect to the national economy, as opposed to the domestic economy, will further illuminate this particular aspect of Trinidad's external transactions.

TABLE 4

TRINIDAD AND TOBAGO

Price Indexes of Exports and Imports
and the Terms of Trade - 1954-1964

Year	Price Indexes		Terms of Trade
	Exports	Imports	
1954	100.0	100.0	100.0
1955	100.7	104.6	96.3
1956	96.6	107.4	89.9
1957	107.5	111 .1	96.7
1958	101.2	107.3	94.3
1959	99.6	105.5	94.4
1960	94.2	116.3	81.0
1961	87.3	129.5	67.4
1962	93.4	132.6	70.4
1963	94.1	126.8	74.2
1964	90.7	129.0	70.3

Source: Annual Statistical Digest, 1965, Central Statistical Office, Government of Trinidad and Tobago, Table 145, adapted to show 1954 = 100.0

Indexes for the period 1961 to 1964 have been obtained from unpublished material.

The various sets of indexes of the capacity to import of Trinidad and Tobago are presented in Table 5; the last column of this table shows the average annual increase or decreases registered by each index between 1954 and 1964.[6]

The degree of separation between the indexes is brought about by the difference in export earnings[7] for each measure or by the divergence between the two price indexes of imports[8] employed or by a combination of both these influences. The differences in export earnings are mainly a result of the deduction of preemptive charges considered with respect to each capacity to import measure. As these charges are greater for one industry than for another - in proportion to the value of exports by the industry - the percentage contribution of each industry to aggregate export earnings changes considerably for each measure of the capacity to import. The contribution to the national capacity to import of sectors with large imported intermediate inputs or foreign-owned profits diminishes drastically as compared with their contribution to the domestic capacity to import. The reverse is true for sectors without foreign ownership.

Table 6 shows the current dollar and percentage contribution of each exporting sector to aggregate export earnings of all sectors between

1954 and 1964 with respect to the Domestic, the Net Domestic and the Current National Capacity to Import.

The results shown in Tables 5 and 6 will be analyzed separately for the economy as a whole and for the industrial sectors in the following section of this paper.

TABLE 5

TRINIDAD AND TOBAGO

Aggregate and Industrial Sector Indexes of the Capacity to Import (All Measures)

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	Average* Annual Average
						The Domestic Capacity to Import						
Aggregate	100	103.7	117.0	135.0	151.8	161.6	160.1	183.1	179.6	191.5	218.5	11.2
Industrial Sector												
111 - Sugar and Rum	100	104.5	84.8	98.0	102.6	108.4	113.7	122.5	94.6	135.9	130.4	3.3
113 - Petroleum	100	105.2	126.2	146.2	163.7	178.9	177.3	199.9	196.9	217.7	234.7	13.2
114 - Other Minerals	100	107.9	95.1	109.3	79.1	106.0	128.5	103.4	97.3	97.8	119.0	.9
115 - Export Agriculture	100	75.3	67.0	62.8	98.5	88.3	66.7	45.3	57.0	66.3	53.5	-3.3
121 - Domestic Agriculture	100	197.6	149.6	137.9	124.5	78.8	132.7	92.3	80.1	68.7	77.2	-8.4
122 & 132 Manufacturing	100	129.2	135.4	133.7	154.1	169.5	160.7	119.1	144.1	154.8	294.0	9.8
133 - Tourism	100	130.6	150.0	175.8	206.4	227.4	211.3	203.2	212.9	237.1	248.4	12.9
138 - Public Utilities	100	95.2	114.3	95.2	123.8	147.6	152.4	147.6	185.2	219.8	212.2	12.8

TABLE 5 (Continued)

TRINIDAD AND TOBAGO

Aggregate and Industrial Sector Indexes of the Capacity to Import (All Measures)

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	Average* Annual Increase
						The Net Domestic Capacity to Import						
Aggregate	100	102.8	119..6	149.9	153.1	156..8	144.3	131..9	126.7	141.7	159.6	3.9
Industrial Sectors												
111 - Sugar and Rum	100	104.6	83.0	103.9	104.6	110.2	112.4	106.7	82.3	131.1	130.4	2.4
113 - Petroleum	100	104.5	135.3	171.2	169.6	178.4	160.5	134.2	127.0	149.2	145.7	2.7
114 - Other Minerals	100	109.6	96.2	117.0	81.5	108.0	125.6	89.2	84.4	93.0	117.0	-.2
115 - Export Agriculture	100	74.6	64.6	66.2	97.9	75.3	64.2	37.7	47.9	61.6	51.8	-3.9
121 - Domestic Agriculture	100	206.7	153.6	149.8	127.6	74.9	130.2	77.1	67.2	59.3	67.6	-10.5
122 & 132 Manufacturing	100	121.8	144.0	144.0	146.8	155.1	152.3	91.4	105.2	155.1	255.5	6.3
133 - Tourism	100	136.2	156.9	196.5	222.4	237.9	215.5	181.0	191.4	236.2	255.2	11.3
138 - Public Utilities	100	95.0	115.0	95.0	120.0	140.0	145.0	115.0	146.9	191.9	191.9	9.2

TABLE 5 (Continued)

TRINIDAD AND TOBAGO

Aggregate and Industrial Sector Indexes of the Capacity to Import (All Measures)

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	Average* Annual Increase
The Current National Capacity to Import												
Aggregate	100	94.8	93.5	112.6	121.0	103.8	107.0	95.6	86.4	89.5	108.2	- .4
Industrial Sectors												
111 - Sugar & Rum	100	97.7	89.5	107.3	111.8	123.6	116.4	107.3	81.4	132.3	133.2	2.6
113 - Petroleum	100	95.2	95.4	109.1	136.4	104.3	109.0	64.1	48.9	64.3	47.8	- 5.8
122 & 132 Manufacturing	This sector shows an increasing deficit.[9]											
All other sectors: Same as Net Domestic Capacity to Import as shown above.												
The Extended National Capacity to Import												
Aggregate	100	103.8	93.3	113.7	130.1	134.0	123.3	105.4	100.7	102.6	156.9	2.5

Sources of data: Tables 30 to 50

* Minus signs indicate decreasing trend lines

TABLE 6

TRINIDAD AND TOBAGO

Percentage Contribution of Each Exporting Sector to Aggregate Export Earning for the Years 1954 and 1964

Year:	1954						1964					
Capacity to Import Measure:	Domes-tic	Net Do-mestic	Curr. Nat.	Domes-tic	Net Do-mestic	Curr. Nat.	Domes-tic	Net Do-mestic	Curr. Nat.	Domes-tic	Net Do-mestic	Curr. Nat.
Sector	Value in W.I. $ Mn.[1]			Percentages[2]			Value in W.I. $ Mn.[1]			Percentages[2]		
111. Sugar and Rum	29.7	28.3	22.0	11.2	14.9	18.0	50.0	48.2	38.3	6.8	13.1	27.0
113. Petroleum	194.3	127.2	71.4	73.4	66.4	58.1	588.4	242.2	44.5	80.5	65.9	31.4
114. Minerals other than petroleum	2.9	2,9	2.9	1.1	1.5	2.4	4.5	4.5	4.5	.6	1.2	3.2
115. Export Agriculture	21.2	20.6	20.6	8.0	10.8	16.8	14.7	14.0	14.0	2.0	3.8	9.9
121. Domestic Agriculture	1.3	1.2	1.2	.5	.6	1.0	1.3	1.0	1.0	.2	.3	.7
122 & 132 Manufacturing	7.0	3.6	-3.2	2.6	1.8	-2.6	26.7	12.9	-5.2	3.6	3.5	-3.7
133. Tourism	6.2	5.8	5.8	2.3	3.0	4.7	19.9	19.4	19.4	2.7	5.3	13.7
138. Public Utilities	2.1	2.0	2.0	.8	1.0	1.6	25.4	25.1	25.1	3.5	6.8	17.7
Aggregate export earnings: (Total all sectors)	264.7	191.6	122.7	100.0	100.0	100.0	730.9	367.3	141.6	100.0	100.0	100.0

[1] Values shown for: the Domestic Capacity to Import are the Value of Exports as per Tables 30 to 38
the Net Domestic Capacity to Import are the Net Value of Exports as per Tables 30 to 38
the Current National Capacity to Import are the National Export Earnings as per Tables 40 to 48
All Tables may be found in Appendix VII.

[2] The percentages shown relate to the value in the third column to the left as a percentage of the total for all sectors. For instance, with respect to the Net Domestic Income Terms of Trade, the Petroleum sector contributed W.I. $ 127.2 mn. out of a total of W.I. $ 191.6 mn. which represents 66.4 percent of the total.

The Economy as a Whole

Table 7 repeats various indexes from Table 5. It shows the changes in the capacity to import of the aggregate economy from year to year, as well as the average annual increases or decreases.

TABLE 7

TRINIDAD AND TOBAGO

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Domestic Capacity to Import										
100	103.7	117.0	135.0	151.8	161.6	160.1	183.1	179.6	191.5	218.5
average annual increase: 11.2										
The Net Domestic Capacity to Import										
100	102.8	119.6	149.9	153.1	156.8	144.3	131.9	126.7	141.7	159.6
average annual increase: 3.9										
The Current National Capacity to Import										
100	94.8	93.5	112.6	121.0	103.8	107.0	95.6	86.4	89.5	108.2
average annual increase: -.4										
The Extended National Capacity to Import										
100	103.8	93.3	113.7	130.1	134.0	123.3	105.4	100.7	102.6	156.9
average annual increase: 2.5										

During the eleven-year period covered, there was a very large increase in the value of exports of goods and services. These rose from $ W.I. 288.3 million in 1954 to $ W.I. 812.7 million in 1964. Exports were rising steadily

over the entire period and no decreases were registered in any year as compared to the previous year. The growth of the petroleum sector is largely responsible for this development. The price index of imports (all goods) rose slowly at first from 100 in the base year 1954 to 105.5 in 1959, then registered a sharp increase to reach a peak of 132.6 in 1962 after which a moderate decline took place. This sudden increase in import prices from 1960 onwards, mainly as a result of unsettled world political conditions, had a depressing effect on the value of exports of goods and services expressed in terms of constant 1954 import dollars. The constant dollar series of exports consequently show a more moderate increase than the current dollar series and rose only to W.I. $ 630.0 million in 1964. Nevertheless, the Domestic Income Terms of Trade for the economy as a whole still registered a considerable increase, rising from 100 in the base year 1954 to 218.5 in 1964 which amounts to an average annual increase of 11.2 points.

Behind the considerable increase in the Domestic Income Terms of Trade for the economy as a whole lie great variations in performance by the industries in the export sector. Average annual increases of approximately 10 points or more were registered by the Domestic Income Terms of Trade for the following sectors.* Petroleum (13.2 points), Tourism (12.9 points), Public Utilities (12.8 points) and Manufacturing (9.8 points). The relative

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* The performances of these sectors will be treated in greater detail under the respective headings of each industrial sector.

importance of these industries within the export sector has also been increasing during the period. The percentage contribution to aggregate export earnings increased for the Petroleum sector from 73.4 per cent in 1954 to 80.5 per cent in 1964; for Tourism from 2.3 to 2.7 per cent; for Public Utilities from .8 to 3.5 per cent and for Manufacturing from 2.6 to 3.6 per cent (Table 6).

More moderate average annual increases were registered by the indexes for Monerals other than Oil (.9 points) and Sugar and Rum (3.3 points) while the percentage contributions of these sectors to aggregate export earnings declined between 1954 and 1964 (Minerals other than Oil from 1.1 to .6 per cent; Sugar and Rum from 11.2 to 6.8 per cent).

Decreasing trend lines were registered both for Domestic and Export Agriculture (average annual decreases of 8.4 points and 3.3 points respectively); the percentage contribution of these sectors to aggregate export earnings also declined over the period (Domestic Agriculture from .5 to .2 per cent; Export Agriculture from 8.0 to 2.0 per cent).

In summary, the Petroleum, Tourism and Public Utilities sectors, and, to a lesser degree, the Manufacturing sector are the dynamic sectors accounting for the high rate of increase of the Domestic Income Terms of Trade for the economy as a whole. On the other hand, the poor performance of the agricultural sector (Domestic and Export Agriculture) is the main negative force influencing the aggregate index. It would seem likely that the Sugar and Rum industry would also have registered a negative trend line if the industry did not benefit from the protection offered by the Commonwealth Sugar Agreements.

The Net Domestic Income Terms of Trade for the economy as a whole rose from 100 in the base year 1954 to 159.6 in 1964, registering an average annual increase of 3.9 points which is a considerable reduction from 11.2 points shown for the Domestic Income Terms of Trade. This degree of separation illustrates the extent of the increase in pre-emptive charges - as a proportion of aggregate export earnings - between 1954 and 1964 brought against the export earnings of the economy by intermediate inputs. These intermediate inputs embodied in exports already amounted to 25.3 per cent of the value of exports in 1954 but rose sharply as a result of the expansion of the petroleum refining and petro-chemical industries to reach 44.7 per cent in 1964. [9] The percentage contribution of the various

industries to the net value of exports (excluding intermediate inputs) also changed considerably as compared with these contributions to the aggregate value of exports; the contribution of the Petroleum industry dropped from 73.4 per cent to 66.4 per cent in 1954 and from 80.5 per cent to 65.9 per cent in 1964. With a large foreign material content embodied in exports [10] the contribution of the Manufacturing sector also decreased from 2.6 to 1.8 per cent in 1954 and from 3.6 to 3.5 per cent in 1964. All other sectors correspondingly gained in relative importance, both in 1954 and 1964, as the foreign material content in the exports of these sectors is proportionately much lower.

Whereas the two measures of the capacity to import discussed above both relate to the domestic economy, the Current National Capacity to Import attempts to obtain a measure of the real external purchasing power of the national economy. For the economy as a whole, this index rose from 100 in the base year 1954 to 108.2 in 1964. There were, however, considerable fluctuations during the period. The highest point was reached in 1958 (121.0) and the lowest in 1962 (86.4). The trend line for the entire period is almost horizontal, showing a slight tendency to decline. Hence, it may immediately be observed that the capacity to import of the national economy (long-term borrowing not being taken into account) has remained approximately at the same level between 1954 and 1964.[11]

The comparison between the Domestic Capacity to Import and the Net Domestic Capacity to Import has already revealed a considerable "gap" between these two indexes due to the deduction of imported intermediate inputs in calculating the latter series. This gap between the conventional (Domestic Income Terms of Trade) and new measure of the capacity to import introduced in this paper becomes even larger when the Current National Capacity to Import is considered. Indeed, while the Domestic Capacity to Import registered an average annual increase of 11.2 points and the Net Domestic Capacity to Import an average annual increase of 3.9 points, the Current National Capacity to Import shows an average annual decrease of .4 points.

The most important factors accounting for the increase in the degree of separation between the conventional and the newly introduced measure of the capacity to import[12] are net factor income payments made abroad (item 40-4a) and capital consumption provisions of foreign-owned firms (item 40-8). The servicing of new capital inflows which occurred particularly during the late 1950's in the oil industry largely accounts for the increases in net factor income payments abroad. The capital consumption provisions of foreign-owned firms also more than doubled between 1957 and 1964 which accounts for a large portion of the increase in pre-emptive charges against foreign exchange earnings.

The price index of goods imported by the national economy (which excludes intermediate inputs to be embodied in exports) rose, generally speaking, faster than the price index of goods imported by the domestic economy (all goods). This more rapid increase is particularly marked between 1959 and 1962 and is partly responsible for the overall decline in the trend line of the Current National Capacity to Import.

For the period as a whole then, the pre-emptive charges against the foreign exchange earnings of the domestic economy have increased as rapidly as these foreign exchange earnings. As a result, National Export Earnings[13] (item 40-10) have stayed at about the same level of W.I. $200 mn between 1958 and 1964 (after a rapid increase between 1956 and 1958).

With rising import prices, the constant import dollar value of National Export Earnings and hence, the Current National Capacity to Import, show a tendency to decline during the period covered. This rather striking observation, interpreted against the background of the export-oriented structure of the economy indicates again the necessity of external financing previously mentioned. This comes particularly to light when one considers the increase in per capita net imports (after deduction of intermediate inputs to be embodied in exports) and in per capita income which took place over the period despite a heavy population growth rate.[14]

These changes are illustrated in Table 8, both in terms of constant dollar values.

The most dynamic industries of the economy - Petroleum, Tourism, Public Utilities and Manufacturing - sell a large part, if not all, of their produce abroad and, thus, operate almost entirely within the export sector. As this sector comprises a large segment of the economy - contributing about one third to GDP - increases in real national income are largely dependent on the performance of the export sector and must thus be manifested through increases in imports. Since the capacity to import of the national economy (The Current National Capacity to Import) has not increased during the period covered in this study, it is obvious that increases in national income must rely heavily on capital inflows. This has been effected through a combination of Government and private borrowing as well as unilateral inflows such as private remittances from abroad.

The effects of Government and private foreign borrowing are reflected in the Extended National Capacity to Import which, for the economy as a whole, increased from 100 in the base year 1954 to 156.9 in 1964; the average annual increase for this index is 2.5 points.

TABLE 8

TRINIDAD AND TOBAGO

Per Capita Net Imports and Income
1954 - 1964

	Per Capita Net Imports of Goods and Services [a] (after deduction of imported intermediate inputs to be embodied in exports) (In constant 1954 import dollars (W.I. $))	Per Capita Income [b] (In W.I. $ at constant 1960 prices)
1954	292.0	628.7
1955	319.0	664.8
1956	308.4	675.2
1957	369.6	760.8
1958	389.1	774.8
1959	408.7	780.3
1960	395.0	812.9
1961	300.7	825.5
1962	300.8	826.4
1963	340.1	817.7
1964	306.3	784.4

Sources of Data: [a]Calculated for the present study by deducting the value of intermediate inputs shown in Appendix VII - Table 40 - item 40-2 from the value of imports of goods and services and dividing by mid-year estimates of population. This series of per capita net imports in current dollars has then further been divided by the price index of imports of goods other than intermediate inputs into exports in order to obtain a constant import dollar series.

[b]1965 IMF Report - Trinidad and Tobago - Tables and Worksheets.

Borrowing from abroad has somewhat closed the gap between the Domestic Capacity to Import and the (Current) National Capacity to Import and has thus increasingly benefitted the national economy over the period considered as compared to the base year 1954.

Private capital inflows account for the largest additions to national export earnings, but approximately half of those are spent on additional imports of capital goods (e.g. oil drilling equipment). New Government loans contracted in 1954, 1962, 1963 and 1964 (of W.I. $20.0, 13.8, 42.6 and 36.9 million, respectively) also contributed substantially to increasing the capacity to import of the national economy and show how the increasing need for external financing has been met. These capital inflows were partially offset by capital outflows such as increases in overseas balances of local banks, increased overseas investments of life insurance companies and unrecorded overseas investments, errors and omissions. Some of these items, however, were positive - representing inflows - in a number of years.

The Industrial Sectors

1. PETROLEUM

Table 9 shows indexes of the Capacity to Import for this industry as well as the average annual increases and the percentage contribution of the industry to the aggregate export earnings of all industries covered in the study for the years 1954 to 1964.

TABLE 9

PETROLEUM

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Domestic Capacity to Import										
100	105.2	126.2	146.2	163.7	178.9	177.3	199.9	196.9	217.7	234.7

average annual increase: 13.2

Contribution to aggregate export earnings[15] 1954: 73.4 per cent

1964: 80.5 per cent

The Net Domestic Capacity to Import										
100	104.5	135.3	171.2	169.6	178.4	160.5	134.2	127.0	149.2	145.7

average annual increase: 2.7

Contribution to aggregate export earnings: 1954: 66.4 per cent

1964: 65.9 per cent

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Current National Capacity to Import										
100	95.2	95.4	109.1	136.4	104.3	109.0	64.1	48.9	64.3	47.8

average annual increase: -5.8 (decrease)

Contribution to aggregate export earnings: 1954: 58.1 per cent

1964: 31.4 per cent

The value of exports of this industry increased from W.I. $ 194.3 million in 1954 to W.I. $ 588.4 million in 1964, mainly as a result of the development of an elaborate refining industry around 1956. This tremendous increase was, however, partly eroded by rising import prices which reduced the constant dollar value of exports in 1964 to W.I. $ 456.1 million. Consequently, the Domestic Capacity to Import for this industry rose from 100 in the base year 1954 to 234.7 in 1964, registering an average annual increase of 13.2 points. The petroleum sector makes the largest contribution to aggregate exports and this contribution has been increasing over the period as a result of the above mentioned development of the industry, rising from 73.4 per cent in 1954 to 80.5 per cent in 1964.

Much of the increase in the value of export earnings, however, is claimed by crude oil imports.[16] Indeed, the net value of exports by the industry (excluding intermediate inputs) rose from W.I. $ 127.2 million in

1954 to W.I. $ 225.9 million in 1957 but did not appreciably increase during the remainder of the period; the highest value of W.I. $ 255.8 million is shown in 1961. Thus, with rising import prices, the Net Domestic Capacity to Import rose much more slowly than the Domestic Capacity to Import, and moved from 100 in 1954 to 145.7 in 1964 with an average annual increase of 2.7 points. This means that pre-emptive charges exercised by crude oil imports are claiming an increasing portion of export earnings during the period considered as compared with 1954.

Correspondingly, the percentage contribution of the industry to the net value of exports as compared with this contribution to the value of exports is subject to a greater reduction at the end of the period than at the beginning. Indeed, in 1954 this percentage contribution was reduced from 73.4 per cent to 66.4 per cent - a reduction of 7 per cent - and in 1964 from 80.5 per cent to 65.9 per cent - a reduction of 14.6 per cent.

Foreign-owned profits, salaries and management fees as well as capital consumption allowances of foreign-owned firms also pre-empt the foreign exchange available from export earnings. Remitted and retained profits fluctuated considerably between 1954 and 1960, at the same time

increasing rapidly, but then remained at about the same level for the rest of the period (item 41-4). Although remitted salaries and foreign rents and royalties are only a small portion of total pre-emptive charges, both items approximately quadrupled between 1954 and 1964 (item 41-5 and 41-6). Capital consumption provisions of foreign-owned firms also increased substantially during the 1950's but levelled off in the early 1960's. This levelling off of repatriated profits and depreciation allowances seems to indicate a settlement at these levels after the expansion phase of the industry had been completed.[17]

Due to these various influences, national export earnings of the petroleum industry, or the foreign exchange available - as a residual - to the national economy, increased between 1954 and 1958 but then decreased rapidly for the remainder of the period. As a result, and with rising import prices, the Current National Capacity to Import for this industry declined from 100 in the base year 1954 to 47.8 in 1964, registering an annual average decrease of 5.8 points. It will be observed, however, that the trend line for the period 1954 to 1960 is close to horizontal while the rapid decline took place between 1960 and 1964.[18]

2. MINERALS OTHER THAN PETROLEUM

Table 10 shows the Capacity to Import Indexes for this industry as well as the average annual increases and the percentage contribution of the industry to aggregate export earnings for the years 1954 to 1964.

TABLE 10

MINERALS OTHER THAN PETROLEUM

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Domestic Capacity to Import										
100	107.9	95.1	109.3	79.1	106.0	128.5	103.4	97.3	97.8	119.0

average annual increase: .9

Contribution to aggregate export earnings: 1954: 1.1 per cent

1964: .6 per cent

The Current National Capacity to Import										
100	109.6	96.2	117.0	81.5	108.0	125.6	89.2	84.4	93.0	117.0

average annual increase: -.2

Contribution to aggregate export earnings: 1954: 2.4 per cent

1964: 3.2 per cent

Minerals other than petroleum include crude fertilizers and crude minerals as well as metalliferous ores and metal scrap. This industry is of

limited importance; exports in 1964 amounted to W.I. $ 4.5 million or less than one per cent of total exports of domestic produce. There is no significant foreign ownership in this industry; hence, the indexes of Net Domestic and Current National Capacity to Import are identical.

As pre-emptive charges against the export earnings of this industry are very low - as a proportion of the value of exports - there is little difference between the value of exports (item 42-1) and the value of National Export Earnings (item 42-7). Consequently, there is also little difference between the two Capacity to Import indexes developed for this industry although the "gap" is accentuated by the fact that the price index of imports of "goods other than intermediate inputs" rise faster than the price index of imports of "all goods". Both show a close to horizontal trend line, the former with an average annual increase of .9 points, the latter with an average annual decrease of .2 points. Hence, both with respect to the domestic economy and to the national economy, the capacity to import of this industry has remained approximately the same for the entire period covered in the study.

3. SUGAR AND RUM

Table 11 shows the Capacity to Import indexes for this industry as well as the average annual increases and the percentage contributions of the industry to aggregate export earnings for the years 1954 to 1964.

TABLE 11

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Domestic Capacity to Import										
100	104.5	84.8	98.0	102.6	108.4	113.7	122.5	94.6	135.9	130.4

average annual increase: 3.3

contribution to aggregate export earnings: 1954: 11.2 per cent

1964: 6.8 per cent

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Net Domestic Capacity to Import										
100	104.6	83.0	103.9	104.6	110.2	112.4	106.7	82.3	131.1	130.4

average annual increase: 2.4

contribution to aggregate export earnings: 1954: 14.9 per cent

1964: 13.1 per cent

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Current National Capacity to Import										
100	97.7	89.5	107.3	111.8	123.6	116.4	107.3	81.4	132.3	133.2

average annual increase: 2.6

contribution to aggregate export earnings: 1954: 18.0 per cent

1964: 27.0 per cent

This industry occupies the second most important place in the exports of the country and the value of its exports increased from W.I. $ 29.7 mn. in 1954 to W.I. $ 50.0 mn. in 1964; the highest value was reached in 1963 with W.I. $ 51.2 mn. The increase in value over the period is mainly due to increases in the prices obtained since the quantities of exported sugar increased only slightly from 172,808 long tons in 1954 to 192,770 long tons in 1964.[19] The sugar industry enjoys considerable protection and benefits from a guaranteed market for most of its produce at prices well above prevailing market prices. Less reliance on sugar has, however, become urgent as there is some expectation that the British subsidies will be discontinued in 1973, when present agreements run out.

Exports of sugar and rum amounted to 11.2 per cent of total exports in 1954 but have proportionately been decreasing, amounting only to 6.8 per cent of the total in 1964 (Table 6)[20]. The Domestic Capacity to Import rose from 100 in 1954 to 130.4 in 1964 with an average annual increase of 3.3 points, well below the increase for the economy as a whole.

Imported intermediate inputs embodied in the exports of this sector are not substantial so that the Net Domestic Capacity to Import follows

very closely the Domestic Capacity to Import index, registering an average annual increase of 2.4 points. The degree of separation between the two indexes is thus insignificant.

More important pre-emptive charges against export earnings are brought about by foreign-owned profits as the sugar manufacturing industry is entirely foreign-owned and, furthermore, approximately two-thirds of the sugar cane is grown on estates of these foreign-owned enterprises.[21] Thus, total pre-emptive charges - including imported intermediate inputs embodied in exports - amount to approximately 25 per cent of the value of exports. With the depressing influence of rising import prices, the Current National Capacity to Import rose from 100 in the base year 1954 to 133.2 in 1964, registering an annual average increase of 2.6 points.

The percentage contribution of the industry to national export earnings rose from 18.0 per cent in 1954 to 27.0 per cent in 1964 and is in both years larger than its percentage contribution to the value of exports. The relative importance of the industry is thus greater with respect to the national economy than with respect to the domestic economy and this importance has also increased over the period.

In summary, there is practically no difference between the three indexes of the Capacity to Import developed in this study for the Sugar and Rum industry, all three registering an average annual increase of close to 3 points. This means that the contribution of the industry to the capacity to import of the aggregate economy (domestic and national) has slightly improved over the period. This improvement has equally benefitted the "normal residents of the country" and the foreign owners of resources of the industry, each group seeing little or no change in their relative positions between 1954 and 1964.

4. EXPORT AGRICULTURE

Table 12 shows indexes of the Capacity to Import for this industry as well as the average annual increases and the percentage contributions of the industry to aggregate export earnings for the years 1954 and 1964.

TABLE 12

EXPORT AGRICULTURE

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Domestic Capacity to Import										
100	75.3	67.0	62.8	98.5	88.3	66.7	45.3	57.0	66.3	53.5

average annual increase: -3.3 (decrease)

contribution to aggregate export earnings: 1954: 8.0 per cent

1964: 2.0 per cent

The Current National Capacity to Import										
100	74.6	64.6	66.2	97.9	75.3	64.2	37.7	47.9	61.6	51.8

average annual increase: -3.9 (decrease)

contribution to aggregate export earnings: 1954: 16.8 per cent

1964: 9.9 per cent

The value of exports of this sector has declined from W.I. $ 21.2 mn. in 1954 to W.I. $ 14.7 mn in 1964. This decline results mainly from a decrease in the exports of cocoa beans and, in the early 1960's, of bananas which has

not been offset by moderate increases in such products as oranges, grapefruits, and marmalades. As may be expected with agricultural produce, there are considerable fluctuations in the values of exports, the highest being reached in 1958 with W.I. $ 22.5 mn and the lowest in 1961 with W.I. $ 12.5 mn. With rising import prices, the constant import dollar value of exports shows an even greater decline, with a value of W.I. $ 11.4 mn in 1964. Consequently, the index of Domestic Capacity to Import has declined from 100 in the base year 1954 to 53.5 in 1964, with an average annual decrease of 3.3 points.

As foreign ownership in this sector is of no practical importance, the only pre-emptive charges consist of intermediate inputs and hence the Net Domestic and Current National Capacity to Import indexes are identical. Imported intermediate inputs are, however, relatively unimportant and amount, generally speaking, to less than 5 per cent of the value of exports. Consequently, there is little difference between the Domestic Capacity to Import and the Current National Capacity to Import, the former registering an average annual decrease of 3.3 points and the latter of 3.9 points. The greater part of this gap is brought about by differences in the price indexes of imports, which are used as deflators, with prices of goods imported by the national economy rising faster than those imported by the domestic economy.

The percentage contribution of the industry to aggregate export earnings both with respect to the domestic and to the national economy has been declining between 1954 and 1964, in the first case from 8.0 to 2.0 per cent, and in the second case from 16.8 to 9.9 per cent. The greater percentage contributions of the sector to aggregate export earnings of the national economy is a result of the lack of foreign ownership in the sector and the decline in the relative importance of other sectors as a result of the repatriation of foreign-owned profits.

Both the indexes of capacity to import and the declining percentage contributions to aggregate export earnings between 1954 and 1964 illustrate the difficult position of the sector as a direct contributor to the capacity to import of the economy. The sector may, however, have been contributing more greatly to import saving by devoting a greater share of its output to the satisfaction of domestic demand.

5. DOMESTIC AGRICULTURE

Table 13 shows the indexes of Capacity to Import for this industry as well as the average annual increases and the percentage contribution of this industry to aggregate export earnings for the years 1954 and 1964.

TABLE 13

DOMESTIC AGRICULTURE

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Domestic Capacity to Import										
100	197.6	149.6	137.9	124.5	78.8	132.7	92.3	80.1	68.7	77.2

average annual increase: -8.4 (decrease)

contribution to aggregate export earnings: 1954: .5 per cent

1964: .2 per cent

The Current National Capacity to Import										
100	206.7	153.6	149.8	127.6	74.9	130.2	77.1	67.2	59.3	67.6

average annual increase: -10.5 (decrease)

contribution to aggregate export earnings: 1954: 1.0 per cent

1964: .7 per cent

The value of exports of this sector show great fluctuations between 1954 and 1964. It first doubled between 1954 and 1955 - from W.I. $ 1.3 mn to W.I. $ 2.6 mn - and then mainly declined for the rest of the period; in 1964 it stood back at the 1954 level. The most important factor accounting for these

fluctuations are exports of oil seeds, the value of which first quadrupled between 1954 and 1955, then rapidly declined to be non-existent in 1960 and all subsequent years. This does not signify a disappearance of the oil seeds produce but rather a complete absorption of this product by the domestic market. With rising import prices, the constant import dollar value of exports shows an even greater decline, rising first from W.I. $ 1.3 mn in 1954 to W.I. $ 2.5 mn in 1955, then to decrease to W.I. $ 1.0 mn in 1964 . The Domestic Capacity to Import declined accordingly from 100 in the base year 1954 to 77.2 in 1964.

As there is no significant foreign ownership in this industry, intermediate inputs are the only pre-emptive charges against export earnings and they do not account for any considerable portion of these. Hence, the Current National Capacity to Import[22] differs only slightly from the Domestic Capacity to Import and has declined from 100 in the base year 1954 to 67.6 in 1964. The "gap" between both indexes is thus not very large, with the Domestic Capacity to Import showing an average annual decrease of 8.4 points and the Current National Capacity to Import an average annual decrease of 10.5 points.

The declining importance of Domestic Agriculture as a foreign exchange earner both for the domestic and the national economy may also be illustrated by the decrease in the percentage contributions of the sector to aggregate export earnings. With respect to the domestic economy, this percentage contribution has decreased from .5 per cent in 1954 to .2 per cent in 1964; with respect to the national economy from 1.0 per cent in 1954 to .7 per cent in 1964. In other words, Domestic Agriculture has retained its character as a "traditional residentiary" sector more to be judged by its performance as a saver than as an earner of foreign exchange. Its importance in the export sector of the economy has never been considerable and has declined over the period.

6. MANUFACTURING

Table 14 shows the indexes of Capacity to Import for this industry as well as the average annual increases and the percentage contribution of the industry to aggregate export earnings for the years 1954 and 1964.

TABLE 14

MANUFACTURING

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Domestic Capacity to Import										
100	129.2	135.4	133.7	154.1	169.5	160.7	119.1	144.1	154.8	294.0

average annual increase: 9.8

contribution to aggregate export earnings: 1954: 2.6 per cent

1964: 3.6 per cent

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Net Domestic Capacity to Import										
100	121.8	144.0	144.0	146.8	155.1	152.3	91.4	105.2	155.1	255.5

average annual increase: 6.3

contribution to aggregate export earnings: 1954: 1.8 per cent

1964: 3.5 per cent

The Current National Capacity to Import

This index has not been computed. Export earnings left after deductions for imported intermediate inputs are not sufficient to pay for the gross profits of foreign-owned enterprises in the sector. This deficit of foreign exchange has increased between 1954 and 1964, the eleven year series being as follows (W.I. $ mn.): -3.2, -3.6, -3.2, -3.6, -5.0, -5.7, -6.1, -8.0, -9.2, -8.3, -5.2.

In Trinidad and Tobago, the manufacturing sector is not very large; exports of manufactured goods in 1960, for example, amounted only to 2.7 per cent of the total value of exports of domestic produce. Manufacturing, nevertheless, covers a wide range of goods such as beer and stout, matches, edible oil, margarine, textiles and cigarettes and the establishment of new industries is encouraged. The value of exports by the sector increased from W.I. $ 7.0 mn in 1954 to W.I. $ 13.8 mn in 1963. It practically doubled between 1963 and 1964, amounting to W.I. $ 26.7 mn in the latter year, due to a large increase in the exports of chemical elements and compounds from W.I. $ .2 mn in 1963 to W.I. $ 10.8 mn in 1964. Such additions of relatively important new industries to a small base can, of course, drastically change the importance of the sector to the economy. The remarkable increase which took place over the whole period is an indication of an increased orientation of the manufacturing sector towards exports. Over the decade 1950-1960, the output of the sector grew at an average annual rate of 9.4 per cent.[23] The Domestic Capacity to Import reflects this jump in export sales, rising steadily over the period from 100 in the base year 1954 to 154.8 in 1963, then registering an index number of 294.0 in 1964.

The value of imported intermediate inputs embodied in the exports of the manufactured products is very high and amounts, in almost all years, to more than 50 per cent of the value of exports with a slight tendency to increase over the period. Hence, there is a gap between the Domestic Capacity to Import and the Net Domestic Capacity to Import, the former registering an average annual increase of 9.8 points and the latter of 6.3 points.

According to a 1958-1959 manufacturing survey of Pioneer Industries[24], foreign ownership in these industries amounted to 83 per cent[25] and, for the purpose of the present study, this percentage figure has been taken as being representative of the manufacturing sector as a whole. Assuming this high level of foreign ownership[26], remitted and retained profits of foreign-owned enterprises tend to be even larger than intermediate inputs. When capital consumption allowances are added to these two items, the sum-total of pre-emptive charges exceeds the export earnings of the industry. Consequently, National Export Earnings are negative - i.e. in the nature of a deficit - for the entire period, amounting to W.I. $ -3.2 mn in 1954 and to W.I. $ -5.2 mn in 1964. The highest deficit was shown in 1962 with W.I. $ 9.2 mn and the lowest in 1956 with W.I. $ 3.2 mn. With import prices rising somewhat faster for the national economy than for the

domestic economy, this deficit is even increased in terms of constant 1954 import dollars which amounted to W.I. $ 6.8 mn in 1964[27]. The deficit position of the industry has thus become worse between 1954 and 1964. In other words, increasing amounts of foreign exchange have to be obtained by the other sectors of the economy to meet the needs of the Manufacturing sector.

With respect to the domestic economy, the percentage contribution of this industry to aggregate export earnings of all industries increased from 2.6 per cent in 1954 to 3.6 per cent in 1964. With respect to the national economy the foreign exchange deficit of the sector, as a percentage of aggregate export earnings, increased from 3.6 per cent in 1954 to 3.7 per cent in 1964.

Although the above situation may cause Balance of Payments difficulties, this would be only one factor to be considered in an evaluation of the contribution by the industry to the economy. This particular situation is mainly a result of the large foreign ownership of the sector combined with the fact that only a relatively small portion of its product is sold abroad (14 per cent)[28] while, on the other hand, imported intermediate inputs embodied in the products of this industry are very large.

A much more thorough examination would be required to evaluate the benefits of the sector to the "national" economy, taking into account such factors as import substitution, employment generated and other primary and secondary effects brought about by the establishment of new enterprises in this sector. Such an analysis is beyond the scope of this paper.

7. TOURISM

Table 15 shows the indexes of Capacity to Import for this industry as well as the average annual increases and the percentage contribution of the industry to aggregate export earnings for the years 1954 and 1964.

TABLE 15

TOURISM

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Domestic Capacity to Import										
100	130.6	150.0	175.8	206.4	227.4	211.3	203.2	212.9	237.1	248.4

average annual increase: 12.9

contribution to aggregate: 1954: 2.3 per cent

1964: 2.7 per cent

The Current National Capacity to Import										
100	136.2	156.9	196.5	222.4	237.9	215.5	181.0	191.4	236.2	255.2

average annual increase: 11.3

contribution to aggregate: 1954: 4.7 per cent

1964: 13.7 per cent

The tourist industry is growing rapidly and the value of exports of tourist services increased from W.I. $ 6.2 mn in 1954 to W.I. $ 19.9 mn in

1964; this rapid increase which took place fairly steadily over the period is greatly due to the small starting base as the industry had been hardly developed in 1954. However, due to the rise in the price index of imports, the constant dollar value of exports by this sector amount only to W.I. $ 15.4 mn in 1964. The Domestic Capacity to Import increased from 100 in the base year 1954 to 248.4 in 1964; the average annual increase of 12.9 points is the second highest of all industries (after petroleum).

Foreign ownership in this sector is of no practical importance and imports of intermediate inputs are the only pre-emptive charges against export earnings. These are mainly spent on imports of food, as well as on construction materials, furnishings, appliances and other items. There is little difference between National Export Earnings and the Value of Exports (items 47-7 and 47-1). Thus, the "gap" between the Domestic Capacity to Import and the Current National Capacity to Import - mainly brought about by differences in the import price indexes used as deflators of export earnings - is not very large, the former showing an average annual increase of 12.9 points and the latter of 11.3 points.

The increasing importance of export earnings of tourism may be illustrated by the percentage contributions of the industry to aggregate

export earnings. With respect to the domestic economy, this percentage contribution increased from 2.3 per cent in 1954 to 2.7 per cent in 1964. With respect to the national economy, the percentage contribution is much larger and increased from 4.7 per cent in 1954 to 13.7 per cent in 1964. Tourism is thus shown in 1964 as the fourth largest contributor (see Table 6) to export earnings of the national economy which emphasizes the increasing importance of the industry as a foreign exchange earner.

8. PUBLIC UTILITIES

Table 16 shows the indexes of Capacity to Import for this industry as well as the average annual increases and the percentage contribution of the industry to aggregate export earnings for the years 1954 and 1964.

TABLE 16

PUBLIC UTILITIES

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
The Domestic Capacity to Import										
100	95.2	114.3	95.2	123.8	147.6	152.4	147.6	185.2	219.8	212.2

average annual increase: 12.8

contributions to aggregate export earnings: 1954: .8 per cent

1964: 3.5 per cent

The Current National Capacity to Import										
100	95.0	115.0	95.0	120.0	140.0	145.0	115.0	146.9	191.9	191.9

average annual increase: 9.2

contributions to aggregate export earnings: 1954: 1.6 per cent

1964: 17.7 per cent

This sector relates to the revenues from the operations of the Port Authority, the Post Office and British West Indian Airlines; the value of its export earnings increased from W.I. $ 2.1 mn in 1954 to W.I. $ 25.4 mn in 1964.

This tremendous increase is brought about mainly by the addition of revenues from B.W.I.A. since 1961 which amount to between W.I. $ 15 mn and W.I. $ 20 mn.[29] With rising import prices, the constant import dollar value of exports amounted to W.I. $ 19.7 mn in 1964 and the Domestic Capacity to Import rose from 100 in the base year 1954 to 212.2 in 1964.

The only pre-emptive charges against export earnings are imported intermediate inputs which amount only to approximately 1 per cent of export earnings. Thus, the "gap" between Domestic Capacity to Import and the Current National Capacity to Import is mainly brought about by differences in the price indexes of imports used to deflate the value of exports. The Current National Capacity to Import rose from 100 in the base year 1954 to 191.9 in 1964, registering an average annual increase of 12.8 points shown for the Domestic Income Capacity to Import.

The percentage contributions of this industry to aggregate export earnings with respect to the domestic and national economies show the increasing importance of the sector as a foreign exchange earner, particularly for the national economy. This percentage contribution rose indeed from .8 per cent in 1954 to 3.5 per cent in 1964 with respect to the national economy. As pointed out above, this is mainly a result of the acquisition by the Government of British West Indies Airlines in 1961.

Conclusions

It is by now widely recognized that the (Net Barter) Terms of Trade have been moving against many countries during the post-war period. This is a result of the decline or stagnation in world prices for the primary products which these countries mainly export while, at the same time, prices for the manufactured goods they import have been rising rapidly. Consequently - ceteris paribus - a given quantity of exports can be exchanged by these countries only for smaller and smaller quantities of imports; on the other hand, the import basket can be made larger by increases in the quantity of exports. It should be observed, however, that the adverse trend in the terms of trade also means that, to obtain a given constant annual increment of imports, ever increasing annual increments of exports will have to be provided.

The (Net Barter) Terms of Trade of Trinidad and Tobago have declined from 100 in 1954, the base year for our study, to 70.3 in 1964.[30] Tremendous increases in the volume of exports, primarily in petroleum and petro-chemical products have offset the adverse effects of this decline, even to the extent of reversing the direction of movement. Indeed, the Domestic Capacity to Import has risen from 100 in the base year 1954 to 218.5 in 1964, registering an average annual increase of 11.2 points. This considerable increase is,

however, not a reflection of an improvement in the capacity to import - and, by implication, in the average level of per capita income - of the "normal residents" of Trinidad. Indeed, after pre-emptive charges against export earnings have been deducted, the capacity to import of the national economy has remained at approximately the same level between 1954 and 1964, as indicated by the Current National Capacity to Import.

The conclusion which may be drawn from this observation is obvious. It is that the national economy - relating to the "normal residents" of the country - has experienced little or no increase in its capacity to import from the tremendous increases in the value of exports which took place between 1954 and 1964. This is a result mainly of two factors. First, the great increase in exports has been accompanied by an even greater increase in imports of intermediate inputs to be embodied in exports. In other words, the "foreign material content" of exports has increased, with concurrent increases in pre-emptive charges against export earnings. Imported intermediate inputs embodied in exports, as a percentage of the value of exports of goods and services of the economy as a whole, increased from 25.3 per cent in 1954 to 44.1 per cent in 1964.[31] This situation has been brought about particularly by the development of the petroleum refining industry around 1960 and of the petro-chemical industry around 1963

due to the increasing imports of crude petroleum and other materials needed for these industries. Second, repatriated profits as well as capital consumption allowances of foreign-owned enterprises have increased greatly during the period. This increase is a normal[32] corollary of the increase in investments in the petroleum industry, mentioned above. Increases in profits would also be expected as a return to the greater working capital needed to deal with the greater volume of exports and imports.

As a result of these factors, and despite tremendous increases in the value of exports of goods and services by the country, National Export Earnings - or the amount of foreign exchange available after pre-emptive charges, as a residual, to the normal residents of Trinidad - has been increasing only very slowly. They amounted to W.I. $158.0 mn in 1954 and to W.I. $223.3 mn in 1964; as a percentage of the value of exports of goods and services, this represents a decline from 54.8 per cent in 1954 to 27.5 per cent in 1964. Consequently, with import prices of goods for the national economy rising even faster than those for the domestic economy, the Current National Capacity to Import exhibits a slightly declining trend during the period covered in the study.

On the other hand, per capita net imports (after deduction of imported intermediate inputs to be embodied in exports) increased from W.I. $ 292.0 in 1954 to W.I.$306.3 in 1964 and per capita income from W.I. $628.7 in 1954 to W.I. $784.4 in 1964. With most growth industries operating almost entirely in the export sector of the economy and this sector being very large, increases in national income can practically only originate in the export sector. However, the claims exercised by the foreign owners of the exporting industries eroded all increases in export earnings which were realized between 1954 and 1964. It follows that the increases in per capita imports and income have by necessity drawn on financing from external sources. This is manifested by the considerable private capital inflows which took place over the entire period, supplemented by Government borrowing in 1954 (W.I. $20 mn), 1962 (W.I. $13.8 mn), 1963 (W.I. $42.6 mn) and 1964 (W.I. $36.9 mn). The heavy Government borrowing between 1962 and 1964 seems to substantiate the rapid decline in our index of the Current National Capacity to Import for the 1960's.

The "gap" between the Domestic Capacity to Import and the Current National Capacity to Import is most pronounced with respect to the Petroleum industry. The former index registered an average annual increase

of 13.2 points - the highest of all industries - while the latter showed a decrease of 5.8 points. Accordingly, the relative importance of the industry with respect to the capacity to import of the national economy is much less than with respect to the domestic economy.

The difference between the Domestic Capacity to Import and the Current National Capacity to Import for the other industries is much less pronounced. This is due to either one or both of two reasons. First, there is more integration of these industries with the national economy in that more local labour is employed, while the proportion of foreign material embodied in exports is smaller, and local purchases are also relatively higher. Second, with the exception of Sugar and Rum and Manufacturing, there is no significant foreign ownership in those industries so that no foreign exchange is required for the servicing of foreign capital in the form of repatriated profits. In those industries, only imports of intermediate inputs into exports pre-empt the foreign exchange available from export earnings.

The Current National Capacity to Import for Tourism and Public Utilities show the greatest average annual increases and these industries had by 1964 become the most important foreign exchange earners for the

national economy, after Petroleum and Sugar and Rum. With the rapid expansion of tourism in the area, it seems likely that these two sectors combined are already the prime contributors to the capacity to import of the national economy. (It will be remembered that revenues from B.W.I.A. are included in Public Utilities).

Both agricultural sectors - Export Agriculture and Domestic Agriculture - registered a decreasing contribution to the capacity to import of the national economy as shown by the declining trend lines of the Current National Capacity to Import for these industries. The trend line for Domestic Agriculture particularly has been declining rapidly. The position of the Sugar & Rum industry would hardly be much better, if the Commonwealth Sugar Agreement were inoperative. Such a deterioration of the situation may well come about when the Agreement expires. The increasingly precarious situation of the agricultural sector is to be noted, particularly since the productive resources of the sector are highly specialized in exportation and cannot readily supply the home market with its food requirements.

The Current National Capacity to Import for Minerals other than Oil show that the contribution of this industry to the capacity to import of the

national economy tends to decrease. The potential for improvement of this sector seems rather limited due to a lack of untapped resources.

The Current National Capacity to Import of the Manufacturing sector reveals an increasing inability of the sector to earn the foreign exchange needed to meet its own needs. The high levels of imported intermediate inputs embodied in its products together with the great extent of foreign ownership in the sector and the limited export sales are the main factors responsible for this situation. As the foreign exchange deficit of the sector is increasing, the capacity to import of the national economy is also increasingly reduced. However, the sector also saves foreign exchange by producing import substitutes.

When national borrowing is taken into account, there is a noticeable improvement in the capacity to import. For the economy as a whole, the Extended National Capacity to Import indeed, registered an average annual increase of 2.5 points compared with the average annual decrease of .4 points registered by the Current National Capacity to Import. This means that external borrowing has increasingly benefitted the national economy, as compared with the base year 1954.[33]

NOTES

1. Between 1954 and 1964:
   - exports of goods and services rose from W.I. $292.7 million to W. I. $825.5 million or multiplied by a factor of 2.8
   - imports of goods and services rose from W.I. $273.5 million to W.I. $744.1 million or multiplied by a factor of 2.7
   - G.D.P. (at factor cost) increased from W.I. $410.5 million to W.I. $1,076.7 million or multiplied by a factor of 2.6

   Source: Annual Statistical Digest 1965 and previous issues.

2. Second Five Year Plan (Draft) 1964-1968, National Planning Commission, Government of Trinidad and Tobago, 1963.

3. William G. Demas, The Economics of Development in Small Countries - With Special Reference to the Caribbean, Montreal McGill University Press, 1965, page 105.

4. F. Rampersad, "Growth and Structural Change in the Economy of Trinidad and Tobago 1951-1961," op. cit.

5. Annual Statistical Digest, 1965

6. Although the indexes start from a base of 100 in 1954, the average annual increases should not be taken for percentage increases (except in the base year) but as index points. If, for instance, an index were to increase by the same number of points each year - in straight linear fashion - say, from 100 in 1954 to 150 in 1964, then the annual increase would be 5 points (50 points divided by 10, as there are 10 annual increases). Since the indexes do not exhibit such orderly behaviour but increase or decrease by an irregular number of points each year, a trend line has been fitted through the year 1959 using the least squares method and the average annual increases or decreases have been measured along this trend line.

NOTES

7. In the remaining part of this paper, the expression "export earnings" will be used in general discussions relating to all measures of the capacity to import and designate whatever value is considered for the numerator in the calculations (i.e. PxQx). This will be the value of exports for the Domestic Capacity to Import, the net value of exports for the Net Domestic Capacity to Import, national export earnings for the Current National Capacity to Import and extended national export earnings for the Extended National Capacity to Import.

8. A comparison of various import price indices seems to suggest that the import price index of "Goods other than Intermediate Inputs Embodied in Exports" used in this paper should be approximately 5 per cent higher for the period 1960 to 1964. This would have a depressing effect on all indexes of the Net Domestic Capacity to Import, the Current National Capacity to Import and the Extended National Capacity to Import. The capacity to import of the national economy would thus be even less than shown in this paper. This matter is further dealt with in Appendix IV.

9. In 1954, exports amounted to W.I. $288.3 mn and intermediate inputs embodied in these exports to W.I. $73.0 mn (25.3 per cent); in 1964 the figures were respectively W.I. $812.7 mn, W.I. $363.6 mn and 44.7 per cent.

10. Amounting to approximately 50 per cent of the value of exports for the entire period covered in this study.

11. The decline in the Current National Capacity to Import may be somewhat greater as the rise in import prices of "Goods other than Intermediate Inputs Embodied in Exports" may have been greater than suggested by the index used in this paper. This matter is further dealt with in Appendix IV.

12. i.e.. the <u>increase</u> in the size of the gap between the <u>Domestic</u> Capacity to Import and the <u>Current National</u> Capacity to Import as compared to the size of the gap between the <u>Domestic</u> Capacity to Import and the <u>Net</u> Domestic Capacity to Import.

NOTES

13. The amount of foreign exchange available, as a residual after all pre-emptive charges, to the national economy.

14. Estimated mid-year population in 1954 amounted to 697,550; in 1964 to 951,050. Annual Statistical Digest.

15. Aggregate export earnings referred to in Tables 9 to 16 means the sum total for all industries considered in the present study as shown in Table 6 (Total all sectors). See also footnote 1, page

16. The increase in refining of imported crude oil seems a healthy development since the reserve to production ratio in 1964 stood at a precarious 10:1, i.e. at current rates of depletion, presently known reserves will only last until 1974. This may be compared with known reserves for Venezuela of 20 years and for the Middle East of 100 years at current rates of depletion. Fortunately for Trinidad, the pre-war concentration of refineries around "sources" has shifted to "market-oriented" refineries. The country is thus in a very advantageous position due to its proximity to North and South America as well as North Africa and Southern Europe.
See - Report of the Commission of Inquiry into the Oil Industry of Trinidad and Tobago 1963-1964, Andre Deutsch Limited, London, 1964, pp. 11.

17. Although the largest capital inflows occurred in 1957 and 1959, with the establishment of the refining industry, they continued at a higher level in the 1960's than in the 1950's. This may be deduced from the officially published total capital inflows, as it is known that the largest part of these concern the petroleum industry; total capital inflows are shown under item 50-2. One part of these funds is spent on increased imports of equipment and other materials and used in investments, the other part flows into the national economy as expenditures on local construction, etcetera.

NOTES

18. This may indicate that pre-emptive charges during the 1960's have been overestimated, although the depressing influence of the rapidly rising price index of imports after 1959 should not be overlooked. The value of intermediate inputs can, however, hardly be disputed as these are in line with recorded inputs of crude oil. Profits and capital consumption allowances also seem in line with the 1954-1960 period and show plausible increases when one considers the large investments in the refining and petro-chemical industries. As limitations of time and particularly of new data have not permitted further investigation and checking of the figures, the estimates shown in this paper have not been revised.

19. Annual Statistical Digest 1965, Table 96; and prior issues.

20. The absolute value of exports by this sector was greater in 1964 than in 1954 but had been rising at a much slower rate than the exports of the other sectors.

21. Report of the Board of Inquiry into a Trade Dispute in the Sugar Industry of Trinidad, December 1960; Government Printing Office, Trinidad, West Indies, 1961, page 4.

22. The Current National Capacity to Import Index is identical with the Net Domestic Capacity to Import index due to the lack of foreign ownership in the sector.

23. F. Rampersad, op. cit., page 112.

24. Industries which are offered incentives under the Aid to Pioneer Industries Ordinance of 1950.

25. "At the end of 1959, local sources of capital ..... account(ed) for 17 per cent of total capital used." See Pioneer Manufacturers - A Study of the Finances of 52 Pioneer Manufacturers 1958-1959", Central Statistical Office, Government of Trinidad and Tobago, Statistical Studies and Papers No. 8, 1961, page 21.

NOTES

26. Since foreign ownership is likely to be lower in non-pioneer industries, this high level may be an over-estimate.

27. This is due to the fact that the deficit is supposed to buy the same quantity of imports as it would have in the base year (when prices were lower).

28. Vide infra, Apprendix III.

29. To account for the abrupt change in the series brought about by this addition since 1961, two indexes have been calculated for this sector respectively for the period 1954 to 1961 and for the period 1961 to 1964. The two indexes have then been linked as shown in Table 48.

30. Vide supra, Table 4, page 34.

31. The entire series of percentages between 1954 and 1964 amounted to, in chronological order: 25.3, 27.1, 24.5, 22.6, 27.3, 29.0, 31.3, 37.8, 39.4, 41.8, and 44.1 per cent.

32. The magnitude of the increase may be considered abnormal, but this is not the concern of the present study.

33. This result must, however, be taken with some caution as the method of computing the amounts available from borrowing may not be generally accepted. The methodology and actual calculations are shown in Appendix V.

APPENDIX I

STATISTICAL CONSIDERATIONS

A statistical expression of the Income Terms of Trade or Capacity to Import has been presented in the paper (page) as PxQx/Pm. Some additional considerations concerning the construction of index numbers are discussed below:

Types of Index Numbers

Indexes may be constructed in a number of ways, each of which will reflect somewhat differently the changes which one proposes to analyze[1]. As it is well known, we have the choice of using current weights (Paasche formula), base-year weights (Laspeyres formula) or the geometric mean between the two (Fisher's ideal index). Whereas from a theoretical viewpoint each method has its merits, the choice of a particular type of index will normally also be governed by the ease with which the relevant data

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1 - Extensive discussions of the problem of constructing and interpreting index numbers of price (or unit values) and quantity in foreign trade may be found in: R.G.D. Allen, "International Trade Statistics" by R.G.D. Allen and J. Edward Ely, New York, Wiley, 1953; pp. 186-211; and also in Charles P. Kindleberger's, "The Terms of Trade - A European Case Study", New York, Wiley, 1956.

can be compiled.[2]

Referring to the general formula PxQx/Pm, the numerator expression - PxQx - for the Capacity to Import is a series of current value flows which is converted into an index with base-year = 100. Hence, changes both in prices and quantities are reflected in this series, without consideration as to which part of the changes are due to either one of these two factors. The denominator - Pm - is a price index of imports; the officially published "average value" indexes of imports have been used for this purpose[3]. The latter are also based on the Laspeyres formula, but using a shifting base -

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2 - The formula employed by Dorrance is shown as follows:

$$\frac{ePl\ eQl}{ePo\ eQo} \qquad \frac{iPl}{iPo}$$

where e stands for exports, i stands for imports
" o stands for base year, l represents any subsequent year.

However, this formula does not give recognition to the weighting patterns in the index as given by the relative quantitative importance of the commodities exported or imported. A more accurate representation would be (where j and k refer to the j'th and kth commodity and take all values from l to s or from l to t, respectively).

$$\frac{(e\ PlQl)}{(e\ PoQo)} \qquad \frac{(iPlQo)}{(iPoQo)} \times 100$$

where e stands for exports, i stands for imports
" o represents the base year, l represents any subsequent year
" s indicates the number of commodities exported, t indicates the number of commodities imported.
See G.S. Dorrance, op. cit., page 52.

3 - For the Net Domestic Capacity to Import, Current National Capacity to Import and the Extended National Capacity to Import, the price index of imports has been adjusted to take the "import content of exports" out of the "import basket. The method is explained in Appendix IV.

as the composition of imports changes over time - and chaining the results.

Choice of Base Year

The selection of a base year for the compilation of a series of index numbers is essentially arbitrary. Nevertheless, it is obviously desirable to base comparisons on a year or period of relative economic stability. No compelling reasons could be found to reject 1954 - the first year of the period covered in our study - as a suitable base year. It was a year of relative world economic stability[4] when the upheavals caused by the Korean War had greatly lost their momentum. Indeed, the slump in the raw materials market which occurred in 1951-52 had been felt mainly in those years and in 1953, while 1954 marked a general strengthening of prices of industrial raw materials and a return to more normal trade patterns.

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4 - According to the U.N. World Economic Survey 1955:
Since about 1953, the world has embarked on a new 'phase of expansion'.
United Nations, Department of Economics and Social Affairs, New York, 1956, page 23.

Prices Versus Unit Values

The question also arises whether to use price quotations or unit values. The main difference between the two relates to accuracy, coverage and timing. On first consideration, it would appear that changes in commodity prices - which is really what we want to measure - will more accurately be reflected in price quotations. Indeed, commodity "classes" are generally not completely homogeneous; hence, changes in average unit values may be partly a reflection of changes in the commodity composition of the group as well as of changes in price. Also, there may be differences in timing between price quotations and unit values if prices change rapidly during the period or when there are significant lags between contracts and shipments. However, in studying the terms of trade, one is interested in the changes in prices at which goods are bought from and sold to foreigners. Where prices charged in the home market differ from those in the foreign market, and where tariffs, taxes, subsidies and price discrimination practices make it difficult to arrive at pertinent price quotations, unit values may be more accurate as a measure of the effective prices of transactions. Considerations of availability also favour the use of unit values.

For countries with foreign or so-called international enterprises operating within their borders, yet another problem must be considered. Here, many transactions are in the nature of bookkeeping entries between the parent firm and the subsidiary. Arrangements within the organization may cause the "declared value" of the transactions to have little resemblance to a market price. Even the terms of transactions between different firms - say, in the oil industry - may be governed by reciprocal and complicated discount arrangements leading to important differences between transfer values and world market prices.

Although practically all countries require these transactions to be reported at some "fair market value", mainly for taxation purposes, the complexity of arrangements and the difficulty of assessing these fair market values call for a cautious interpretation of reported figures and any statistical measures calculated from them. A practical example may make this point more clear: suppose that an American based company operating in Trinidad exports refined oil to the United States. Undervaluation of this transaction will cause deterioration in the Terms of Trade of Trinidad. However, reported gross profits will normally be less and - if the rate of taxation remains at the same level - expatriated profits from the Trinidadian subsidiary will also be lower. Hence, National Export Earnings - which,

for this example - may be defined as export earnings minus expatriated profits - may not change. Therefore, the capacity to import of the "national" economy (Current National Capacity to Import) will not be affected by the undervaluation.[5]

The net impact of all these considerations is impossible to evaluate. However, following general practice and because of the more readily available data, the indexes of average unit values of imports have been used in this paper.

Inclusion of Service Transactions

The various items included in the calculations for each of the four different capacity to import measures used are shown in detail in the paper (pp. et. seq.) Limitations of time and data, however, have made it impossible to include all items which, in theory, ought to be included. Deviations have been indicated in the appropriate tables of Appendix VII. However, it seems relevant to discuss in greater detail, the problems presented by the inclusion of "service transactions" in the export and import baskets.

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5 - An interesting discussion of this problem with respect to the banana industry and the operations of United Fruit and Standard Fruit and Steamship Corporation in Central America may be found in Richard A. La Barge, "The Imputation of Values to Intra-Company Exports - The Case of Bananas", Social and Economic Studies, Vol. 10, No. 2, June 1961.

There is no doubt that the inclusion of service transactions will provide an index superior to one based on merchandise transactions alone. However, the difficulties of constructing a price index for services are considerable particularly because the "quantities" involved in the transactions are not easily measured. Hence, all regularly published statistics of the terms of trade are based on merchandise transactions alone[6].

For the purposes of the present study and in order to reflect as accurately as possible the true foreign exchange earnings position of the country, exports of services have been included in our calculations. This presents no difficulties as we are dealing with value flows and there is no need to measure price movements separately. However, for the price index of imports - which figures as the denominator in the indexes of this study - only merchandise transactions have been considered, since no price indexes of "service transactions" are available and in view of the difficulties of constructing them.

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6 - A few attempts have been made to include "services" in the terms of trade. See e.g. C. Carbonelle and E.S. Kirschen, "Les Termes des Echanges", Revue de l'Institut de Sociologie (Bruxelles), 1949, pp. 419-446. also C. Kindleberger, op. cit. pp. 28 and 305 et. seqq.

The price index for merchandise transactions alone may be considered the "best approximation" to a price index of goods and services, given the usual availability of data. The closer average prices of services move relative to average prices of goods, the more accurate this approximation will be. In our opinion, the adjustments which would have to be made to the indexes used in this study if services were included in the computations would not be of such magnitude that they would necessitate changing the conclusions reached.

APPENDIX II

DESCRIPTION OF INDUSTRIAL SECTORS

BY S.I.T.C. CODES

INDUSTRIAL SECTORS

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors, by S.I.T.C. Codes		
		SITC CODE	ITEM	REMARKS
113	Petroleum Industry			
113.1-3	Petroleum Products	313	Petroleum Products	All of Division 31 except 313-04 (lubricating oils)
		314	Gas, natural and manufactured	
		521	Mineral tar, tar oils and other crude chemicals from coal, petroleum and natural gas	
113.4	Petro-chemical Products	313-04	Lubricating Oils	
		561	Fertilizers, manufactured	

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors, by S.I.T.C. Codes		
		SITC CODE	ITEM	REMARKS
111	Sugar Industry			
111.2 &.41	Sugar and Molasses	061-01	Cane sugar, beet sugar not refined	
		061-04.21	Molasses, in bulk	
111.3 & .42-.49	Sugar products and Rum	061-02	Cane sugar, beet sugar, refined	All of 061 except unrefined sugar and bulk molasses.
		061-04.29	Syrup	
		061-04.29	Molasses in tins	
		061-09	Glucose & other sugars	
		062	Sugar confectionery and other sugar preps.	
		112-04	Rum	All of 112-04 excluding gin, whisky and other non-rum alcoholic beverages

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors, by S.I.T.C. Codes		REMARKS
		SITC CODE	ITEM	
114	All other Minerals	271	Fertilizers, crude	All of Div. 27
		272	Crude Minerals, except coal, petroleum, fertilizer materials and precious stones	
		282-01	Iron and steel scrap	All of Div. 28 (Metalliferous ores and metal scrap) except Bauxite and Alumina
		283-07	Manganese ore and concentrates	
		284-01	Non-ferrous metal scrap	

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors, by S.I.T.C. Codes		REMARKS
		SITC CODE	ITEM	
115	Other Agricultural Export Industries			
115	Fresh fruits and vegetables	051-01)	Citrus fruits	
		051-02)		
		051-03	Bananas	
		071-01	Coffee beans, raw	
		072-01	Cocoa beans	
		075	Spices	

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors, by S.I.T.C. Codes		REMARKS
		SITC CODE	ITEM	
121	Traditional Residentiary Agriculture (including forestry and fishing)	001	Live animals (cattle, sheep, poultry, etc)	
		011	Meat, fresh, chilled, frozen	
		021	Fresh milk and cream	
		023	Butter	
		024	Cheese	
		025	Eggs	
		026	Honey	
		029	Other dairy products	
		031) 032)	Fish and fish preparations	
		041-045	Rice and cereals, unmilled	
		051-04) 051-05) 051-06)	Mangoes, pineapples and other tropical fruit	
		051-07	Coconuts & other edible nuts	
		052-07	Dried fruit	

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors, by S.I.T.C. Codes		REMARKS
		SITC CODE	ITEM	
121	Traditional Residentiary Agriculture (including forestry and fishing) Continued....	054	Vegetables, fresh and dried	
		081	Feeding stuffs for animals (unmilled)	
		121-01	Tobacco, unmanufactured	
		211-04	Hides and skins	
		231-01	Natural rubbers and similar natural gums	
		241-01	Fuelwood	
		241-02	Charcoal	
		242	Wood in the round and roughly squared (timber)	
		29	Animal and vegetable crude materials, inedible n.e.s.	Logwood, anatto, vegetable seeds, plants, cut flowers, etc.

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors by S.I.T.C. Codes		REMARKS
		SITC CODE	ITEM	
122 (Part)	Other Agricultural Export Industries			
122.2	Food Processing	09	Miscellaneous food preparations	Margarine, essences, vinegar, sauces, etc.
		111	Beverages	All of 111 except rum. (Carbonated beverages beer, gin, liqueurs)
122.3	Tobacco Products	122-01.1	Cigars & cheroots	
		122.02	Cigarettes	
		122.03	Other manufactured tobacco	
122.4 & 7	Wood and Paper Products	63	Wood Manufactures	All of Div. 63 (boxes, crates, etc)
		64	Paper, paperboard & paper manufactures	All of Div. 64 (paper-bags, toilet paper, etc).
		25	Pulp and waste paper	All of Div. 25
		26	Textile fibres and waste	Textile fibres not manufactured into yarn, thread or fabrics.

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors, by SITC Codes		REMARKS
		SITC CODE	ITEM	
122 (Part)	Other Agricultural Export Industries			
122.5	Furniture and Fixtures Manufacturing	82	Furniture and Fixtures	All of Div. 82 including wooden & metal furniture
122.6	Non-metallic Mineral Manufactures	66	Cement, clay, mica, bottles, glassware, pottery	All of Div. 66
122.8	Printing and Publishing	892	Printed matter	All of Section 892 (Newspapers & other printed matter)
122.11-13	Processed fruit and vegetables	053	Preserved fruits and fruit preparations (citrus fruit juices, jams, etc.)	
		071-02	Coffee, roasted	
		071-03	Coffee extracts	
		072-02	Cocoa powder	
		072-03	Cocoa butter	
		073	Chocolate confectionery and chocolate products	

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors, by S.I.T.C. Codes		REMARKS
		SITC CODE	ITEM	
122 (Part)	Other Agricultural Export Industries			
122.15-19 &	Food Processing	012	Meat, dried, salted, smoked, cooked	
		013	Meat, canned and meat preparations	
		022	Milk and cream, evaporated, condensed, dried	Including other manufactured dairy products (butter, cheese) if any
		046-01	Flour	
		047	Cereals, milled, except wheat flour	Corn meal, etc.
		048	Cereal preparations	Bread and bakery products, biscuits, oat flakes, & other breakfast foods
		055	Vegetables preserved, and vegetable preparations	Vegetable juices, pickles, prepared arrowroot, etc.
		081	Animal feeds	Oil-seed cake, etc excluding unmilled cereals.

INDUSTRIAL SECTORS
(Continued)

Accounting Frameword No.	NAME OF INDUSTRY	Description of Industrial Sectors by S.I.T.C. Codes		REMARKS
		SITC CODE	ITEM	
132	Manufacturing Industries			
132.1-2	Textiles and Clothing	65	Textile yarn, fabrics & made-up articles	All of Div. 65
		*		
132.3-4	Leather Products and Rubber Products	61-01	Sole Leather, other leather	All of Div. 61
	Manufacturing	62	Rubber manufactures	All of Div. 62
		83	Luggage, handbags, etc.	All of Div. 83
		85	Footwear	All of Div. 85
132.5	Chemical Products Manufacturing	511	Inorganic chemicals	
		511.01 to 511.09	Sulphuric acid, carbon dioxide, copper, sulphate, etc.	All of Div. 51
		512	Organic Chemicals	
		512-03 to 512-09	Glycerine, acetylene, etc.	
	* Insert :	84	Clothing	All of Div. 84

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors by S.I.T.C. Codes		REMARKS
		SITC CODE	ITEM	
132	Manufacturing Industries (Continued...)			
132.5 Cont'd..	Chemical Products Manufacturing	53	Paints, enamels, dyeing, tanning, & colouring materials	All of Div. 53
		54	Medicinal & pharmaceutical products	All of Div. 54
		55	Essential oils, perfumes, polishing & cleansing materials	All of Div. 55
		59	Disinfectants, insecticides and Miscellaneous chemical products	All of Div. 59
132.7	Metal Manufactures	68	Base metals, aluminium & aluminium alloys	All of Div. 68
		69	Metal manufactures	Nails, cans, household utensils of aluminium, etc.
132.8	Electrical Machinery and Appliances	72	Electric batteries and appliances	All of Div. 72

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors, by SITC Codes		REMARKS
		SITC CODE	ITEM	
132	Manufacturing Industries (Continued....)			
132.8 Cont'd..	Electrical Machinery & Appliances Cont'd..	812-04	Electric Lighting fixtures	All of Div. 81, which is defined as "prefabricated buildings, sanitary, plumbing, heating and lighting fixtures and fittings" but actual output consists of electrical fittings.
132.9-10	Other Machinery and Equipment	716-08	Textile Machinery	
		716-13	Sugar Machinery	All of Div. 71
		716-13	Other Machinery and Appliances	
		73	Transportation Equipment	All of Div. 73 but mainly 732-01 Passenger vehicles.

INDUSTRIAL SECTORS
(Continued)

Accounting Framework No.	NAME OF INDUSTRY	Description of Industrial Sectors, by S.I.T.C. Code		REMARKS
		SITC CODE	ITEM	
132	Manufacturing Industries (Continued...)			
132.11	Miscellaneous Manufacturing	67	Silver, Platinum, Gems and Jewellery	All of Div. 67
		86	Professional and Scientific instruments, photographic & optical goods, watches, clocks	All of Div. 86
		891	Phonographs & musical instruments	All of Div. 89 except 892 (Printed Matter)
		899	Other Manufactured Articles	Buttons, plastic articles, brushes, pins, etc.

APPENDIX III

TRINIDAD AND TOBAGO

DERIVATION OF ESTIMATES OF THE IMPORT CONTENT OF EXPORTS

Estimates of the "foreign material" embodied in exports were obtained by assigning each imported commodity to a particular 'using sector' in the economy or apportioning it over various using sectors. The using sectors, as the term is employed here, include the eight exporting industries defined in this paper[1] as well as non-exporting industries - such as construction and distribution - and also households and government. In this allocation process, a distinction was made between imports for consumption and imports on capital account. The latter have been calculated separately and are considered as the "import content of borrowing", used in the present study with respect to the Extended National Capacity to Import (see page ..... item 50-7).

The allocation of imports to using sectors made it possible to calculate the value of imports by each of the eight exporting industries. However, the products of these industries - in which these imports are embodied - are sold partly on the home market and partly abroad. To obtain the import content of exports, the imports used by each industry were multiplied by the ratio of foreign sales over total sales for that industry. This assumes, of course, that the import content of products destined for the home market is the same as that of the products sold abroad.

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1 - See p. et. seq.

The import content of exports, per industry, which was calculated on the above explained basis, is shown in Table 17, while Table 18 shows the ratios of foreign sales to total sales of each exporting industry, which were used to obtain the figures in Table 18.

TABLE 17

TRINIDAD AND TOBAGO
Estimates of Imported Intermediate Inputs Embodied in Exports

$ W.I. 000

Item	43-2 111	41-2	42-2 114	44-2 115	45-2 121	46-2	47-2	48-2 138	40-4
Industry	Sugar and Rum	113 Petroleum	Other Minerals	Export Agriculture	Domestic Agriculture	122 & 132 Manufacturing	133 Tourism	Public Utilities	- Aggregate
Year									
1954	1,339.9	67,112.3	5.0	590.9	78.7	3,415.2	355.7	88.6	73,050.7
1955	1,915.7	76,562.8	6.1	871.4	91.3	5,022.9	350.1	92.7	84,913.1
1956	2,058.2	80,595.0	4.1	1,121.2	97.7	4,698.2	292.5	96.3	88,963.3
1957	1,771.3	89,638.5	9.5	647.0	93.9	5,147.8	274.3	229.5	97,811.8
1958	1,953.0	117,735.6	15.2	1,512.8	121.2	6,228.2	354.2	314.8	128,235.1
1959	1,788.5	132,175.3	14.2	732.3	133.3	6,792.7	527.5	408.5	142,572.4
1960	1,521.8	158,224.7	18.9	745.0	119.9	6,719.7	436.5	313.5	168,100.1
1961	1,897.6	247,299.8	17.6	792.2	141.5	5,873.0	574.3	458.2	258,426.1
1962	1,678.3	260,424.4	15.0	967.0	127.5	6,663.9	493.1	317.5	270,686.6
1963	1,684.1	283,195.3	7.4	875.9	163.3	6,346.5	418.6	305.9	292,997.1
1964	1,826.9	346,295.6	27.8	687.3	214.5	13,785.0	528.6	274.7	363,640.4

SOURCES OF DATA:

Calculated from External Trade statistics according to definitions by S.I.T.C. numbers shown in Appendix II.

TRINIDAD AND TOBAGO

TABLE 18

Estimated Ratios of Foreign Sales to Total Sales - per Exporting Industry

Industry / Year	111 Sugar and Rum	113 Petroleum	114 Other Minerals	115 Export Agriculture	121 Domestic Agriculture	122 & 132 Manufacturing	133 Tourism	138 Utilities
1954	0.738	0.943	0.045	0.397	0.040	0.140	1.0	0.518
1955	0.815	0.934	0.043	0.437	0.040	0.140	1.0	0.518
1956	0.777	0.941	0.029	0.508	0.040	0.140	1.0	0.518
1957	0.776	0.937	0.033	0.313	0.040	0.140	1.0	0.518
1958	0.685	0.941	0.051	0.509	0.040	0.140	1.0	0.518
1959	0.667	0.930	0.056	0.306	0.040	0.140	1.0	0.518
1960	0.697	0.934	0.050	0.339	0.040	0.140	1.0	0.518
1961	0.746	0.942	0.061	0.325	0.040	0.140	1.0	0.518
1962	0.755	0.938	0.040	0.451	0.040	0.140	1.0	0.518
1963	0.768	0.939	0.019	0.398	0.040	0.140	1.0	0.518
1964	0.802	0.940	0.056	0.264	0.040	0.140	1.0	0.518

SOURCES OF DATA

Estimates developed from the data-bank established by this Project at the Centre for Developing Area Studies, McGill University, Montreal.

APPENDIX IV

TRINIDAD AND TOBAGO

PRICE INDEX OF IMPORTS OF GOODS

OTHER THAN INTERMEDIATE INPUTS

TO BE EMBODIED IN EXPORTS

Constant import dollar values of the export earnings of the economy are obtained by dividing the series of current export values by the price index of imports for the same time period. Export earnings are different for each of the four Capacity to Import measures calculated for this study. The import basket on which the price index of imports used as a deflator of these export earnings is based should have relevance to these export earnings. For the calculation of the Net Domestic Capacity to Import as well as for the National and Extended National Capacity to Import, imported intermediate inputs embodied in exports have been deducted from the value of exports. Correspondingly, the price index of imports used as a deflator to obtain the constant dollar values of exports should be based on an import basket which does not contain these intermediate inputs.

With respect to Trinidad, crude oil accounts for more than 80 per cent[1] of total imported intermediate inputs embodied in exports; indeed, since 1961, these account for more than 95 per cent. Hence, the removal of crude oil imports from the import basket will provide us with a close approximation of the import basket of "goods other than intermediate inputs to be embodied in exports". A price index based on imports other than crude oil has been

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1 - Imports of crude oil, as a percentage of "total imported intermediate inputs embodied in exports", for the period 1954 to 1964, are as follows, in order: 84.4, 82.0, 81.0, 84.9, 85.3, 86.7, 88.9, 97.3, 94.7, 95.1, and 95.4.

calculated for the purpose of this study, using computer facilities and computerized data copied from annual trade publications and stored in our data-bank. At the same time, price indexes were calculated for "crude oil" and "all goods". Difficulties were, however, encountered with the magnetic computer tapes which made the second part of the indexes unreliable; hence, only the first part of the computed price indexes[2] has been used in this paper, i.e. for the period 1954 to 1960. Price indexes of imports of oil, goods other than oil and all goods for the period 1960 to 1964 were obtained from unpublished material in the possession of the Project Team. The indexes calculated for this paper - for the period 1954-1960 - were then linked with those obtained for the subsequent period 1960 to 1964.

The indexes of imports of oil, goods other than oil, and of all goods thus obtained are shown in Table 19.

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2 - As explained in Appendix I, we are really using an index of "average unit values"; reference is made throughout the paper to a "price index" for the sake of easier reference.

TRINIDAD AND TOBAGO

Price Indexes of Imports of Oil, Goods Other than Oil and All Goods for the Period 1954 to 1964

TABLE 19

YEAR	OIL[3]	GOODS OTHER THAN OIL[4]	ALL GOODS[3]
1954	100.0	100.0	100.0
1955	105.9	102.9	104.6
1956	110.9	106.2	107.4
1957	121.7	103.7	111.1
1958	114.7	103.6	107.3
1959	106.2	103.3	105.5
1960	100.1	118.7	116.3
1961	104.1	149.8	129.5
1962	106.9	152.6	132.6
1963	107.4	133.4	126.8
1964	111.4	130.6	129.0

---

3 - The price index of oil follows closely and may be compared with the published average value index for SITC Section 3; the price index for all goods is identical with the corresponding average value index for all goods. These indexes are published in the Annual Statistical Digest.

4 - See discussion of this index below.

A comparison between the two indexes - all goods and goods other than oil - shows a significant change in the relationship for the period 1960 to 1964 as compared to the period 1954 to 1959. In the first period - 1954 to 1959 - the index for all goods generally rose faster and exhibited greater fluctuations than the index for goods other than oil. In the second period - 1960 to 1964 - this situation is practically reversed, with the index for goods other than oil showing the greater fluctuations. The tremendous increase in the latter index between 1959 and 1952, rising from 103.3 to 152.6, is indeed remarkable and may raise questions regarding the validity of this index. However, the indexes for Oil[5] and for All Goods shown in Table 19 agree with the indexes of average unit values published in the Annual Statistical Digest. The index for All Goods may be viewed as a weighted average of the index of Oil and Goods other than Oil. Hence, accepting these two indexes as the more reliable, it would seem that the index number for Goods Other than Oil for the year 1960 should be higher and probably about 124 (instead of 118.7) since oil imports in 1960 accounted for 31.44 per cent of total imports. It would indeed appear that the whole series of index numbers for Goods other than Oil between 1960 and 1964 should be 4 to 5 per cent higher.[6]

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5 - Accepting SITC Section 3 as representative.

6 - This would have a depressing effect on all indexes of the Net Domestic Capacity to Import and of the Current and Extended National Capacity to Import; see also footnote .... page ....

Due to lack of time and suitable data for ready comparison it has not been possible to thoroughly investigate this matter. (It is unfortunate that the indexes of average unit values of imports published in the latest issue of the Annual Statistical Digest - for the year 1965 - do not extend beyond 1960).

APPENDIX V

PUBLIC BORROWING AND AVAILABLE OVERSEAS HOLDINGS

TABLE 20

TRINIDAD AND TOBAGO
Public Borrowing And Available Overseas Holdings

W. I. $ mn.

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
1 - Borrowing overseas by the central Government	20.0								13.8	42.6	36.9
2 - Less reimbursements	___	___	___	___	___	___	___	___	1.8	3.4	22.2
3 - Remains available	20.0								12.0	39.2	14.7
4 - Increase in Government and Currency Board short-term holding overseas	15.7	-6.9	-8.2	-7.2	18.7	-5.1	-11.4	1.8	-2.9	13.2	2.2
5 - Available from borrowing plus overseas holdings	20.0	15.7	8.8	.6	-6.6	12.1	7.0	-4.4	6.5	35.9	64.3

SOURCES OF DATA AND METHODOLOGY

Item 1 - 1965 IMF Report - Tables and Worksheets - Trinidad and Tobago, page 14, Table L.

Item 2 - ibid.

Item 4 - The National Income of Trinidad and Tobago - 1952 to 1962 - Central Statistical Office - Government of Trinidad and Tobago, page 5 - item 3-10 . Figures for 1963 and 1964 have been obtained from unpublished material.

Item 5 - The figures under item 5 have been calculated from the series under item 4 by the following method; Of the W.I. $ 20 mn borrowed in 1954 only W.I. $ 4.3 mn were actually used during that year, the remaining W.I. $ 15.7 being deposited overseas as indicated under item 4. Hence, at the beginning of 1955 there were still W.I. $ 15.7 mn available; this is entered against item 5 for the year 1955. During 1955 W.I. $ 6.9 mn were used as indicated against item 4 under 1955. Hence, at the beginning of 1956 the available funds from borrowing amounted to W.I. $ (15.7 minus 6.9) or 8.8. This procedure is continued until 1964. In those years in which new borrowing takes place, i.e. 1962, 1963 and 1964, the relevant amounts are added to the amounts available from previous borrowing.

TABLE 20

Item 5 (continued...)

This method of calculation has been used because we want the Extended Capacity to Import index to reflect the extra foreign exchange available from borrowing at the beginning of each year.

APPENDIX VI

EVALUATION OF CERTAIN ESTIMATES DEVELOPED FOR THE PRESENT STUDY AND COMPARISON WITH ESTIMATES FROM OTHER SOURCES

EVALUATION OF CERTAIN ESTIMATES DEVELOPED FOR THE PRESENT STUDY AND COMPARISON WITH ESTIMATES FROM OTHER SOURCES

There are certain indications that we have tended to under-estimate the imported intermediate inputs embodied in exports. Consequently, the net value of exports has been over-estimated as well as all other measures based on this value. Since the indexes calculated for this paper show primarily a relationship between the base year and subsequent years - which is the essence of any index - the net effect of these errors of estimation cannot easily be evaluated. However, the under-estimation of the import content seems largest in the base year, as will be shown in this appendix. Hence, the Net Value of Exports, National Export Earnings and Extended National Export Earnings[1] have been over-estimated by a greater amount in the base year 1954 than in subsequent years. As a result, the indexes developed from these series of figures (e.g. under items 40-10 and 50-8) show less divergence from the base of 100 than they should. Consequently, the gap between the Domestic Capacity to Import, on the one hand, and the Net Domestic Capacity to Import, the Current National Capacity to Import or the Extended National Capacity to Import, on the other hand, is probably less pronounced than shown in this paper. A series of revised indexes for the aggregate economy, based on estimates of the import content of exports obtained from other sources is shown further in this appendix

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1 - See tables 40 to 50.

The Import Content of Exports

Table 21 shows the import content of aggregate exports as a percentage of exports as estimated for this study (in current dollars).

TABLE 21

TRINIDAD AND TOBAGO
Import Content of Aggregate Exports
as a Percentage of these Exports

Year	Exports of goods and services W.I. $ mn.	Estimated import content of Exports W. I. $ mn.	Import Content as a percentage of Exports
1954	292.7	73.0	24.9
1955	318.9	84.9	26.6
1956	370.6	89.0	24.0
1957	445.0	97.9	22.0
1958	482.0	128.2	26.6
1959	506.5	142.6	28.1
1960	551.7	168.1	30.5
1961	697.7	258.4	37.0
1962	699.2	270.7	38.7
1963	716.1	293.0	40.9
1964	825.5	358.2	43.4

The percentage figures in the last column of Table 21 may be compared with those developed by F. Rampersad[2] and published in two papers.

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2 - Rampersad, Growth and Structural Change in the Economy of Trinidad and Tobago 1951-1961, Research Papers, Central Statistical Office, Government of Trinidad and Tobago, No. 1, December 1963, Table XIII, page 132.

The first paper shows percentage estimates of the real (constant dollar) import content of exports of goods and services for the years 1954, 1956, 1958, 1960 and 1961; they are presented in Table 22 under the heading: Rampersad (1). The second paper shows estimates of the import content of exports as a percentage of exports[3] using current values. These are shown in Table 22 for the years 1954 to 1959 under the column heading Rampersad (2).

TABLE 22

TRINIDAD AND TOBAGO
Import Content of Exports

Year	(Percentages) Estimates developed For this Study	Estimates by F. Rampersad (1)	(2)
1954	24.9	34.2	31.2
1955	26.6	n.a.	31.2
1956	24.0	26.2	27.5
1957	22.0	n.a.	27.3
1958	26.6	31.2	31.8
1959	28.1	n.a.	32.2
1960	30.5	31.3	n.a.
1961	37.0	38.1	n.a.
1962	38.7	n.a.	n.a.
1963	40.9	n.a.	n.a.
1964	43.4	n.a.	n.a.

SOURCES OF DATA: See footnotes 2 and 3.

3 - F. B. Rampersad, Some Aspects of the External Trade and Payments of Trinidad and Tobago 1951-59, Social and Economic Studies, Vol. 12, No. 2 June 1963, Table 2, page 107.

Both sets of percentage estimates developed by Rampersad agree fairly closely with our own, although it should be noted that the estimates under Rampersad (1) are not strictly comparable since they are in real terms. The largest divergence occurs in 1954 with a difference between our percentage estimate and Rampersad (2) of 6.3 percentage points.

Based on Rampersad's estimates (Table 22, last column), revised indexes of the Current National and Extended National Capacity to Import have been calculated; they are shown in Tables 23 and 24 to be compared with the indexes developed in this study.

The two series of indexes shown under numbers 6 and 7 in Table 23 differ only very slightly and the same is true for the two series entered under the same numbers in Table 24. It would thus appear that under or over-estimates of pre-emptive charges in our calculations would have to be much greater in order to significantly affect the direction of the capacity to import indexes developed in this study. Hence, the analysis presented and the conclusions drawn in this paper will not be affected by possible errors unless the estimates were considerably more off the mark.

TRINIDAD AND TOBAGO

Revision of the Current National Capacity to Import
Based on Other Estimates of the Import Content of Exports
For the Period 1954 to 1959

TABLE 23

W.I. $ mn.

	1954	1955	1956	1957	1958	1959
1 - Aggregate National Export Earnings as per item 40-10	158.0	154.2	157.0	184.5	198.1	169.4
2 - Deduct: over-estimation of above	18.3	14.6	12.9	23.6	25.1	23.5
3 - Revised estimates of Aggregate National Export Earnings	139.7	139.6	134.1	160.9	173.0	145.9
4 - Price Index of imports excluding imported intermediate inputs into exports (Item 40-11)	100.0	102.9	106.2	103.7	103.6	103.3
5 - Constant dollar value of revised estimates above	139.7	135.7	126.3	155.1	167.0	141.2
6 - Revised Current National Capacity to Import	100.0	97.1	90.4	111.0	119.5	101.1
7 - Current National Capacity to Import as developed in the present study (Item 40-15)	100.0	94.8	93.5	112.6	121.0	103.8

SOURCES FOR TABLE 23

Table 23 is a revision of Table 40 intended to test the effect on the Current National Capacity to Import of the economy as a whole (Item 40-15) of an assumed underestimation of imported intermediate inputs into exports (Item 40-2) (Leading to an overestimation of aggregate National Export Earnings).

The values shown under item 2 above were derived at by using the percentage estimates shown in Table 22 under column 4 (Rampersad 2) to obtain estimates of the import content of exports. Rampersad's estimates and our own as well as the differences between them are as follows:-

Import Content of Exports

Year	Rampersad	W.I. $ mn.	Present Study	Difference
1954	91.3		73.0	18.3
1955	99.5		84.9	14.6
1956	101.9		89.0	12.9
1957	121.5		97.9	23.6
1958	153.3		128.2	25.1
1959	166.1		142.6	23.5

TRINIDAD AND TOBAGO

TABLE 24

Revision of Extended National Capacity to Import
Based on Other Estimates of the Import Content of Exports
For the Period 1954 to 1959

W.I. $ mn.

	1954	1955	1956	1957	1958	1959
1 - Aggregate Extended National Export Earnings as per Item 50-8	171.2	183.0	169.7	201.8	230.7	237.1
2 - Deduct: overestimation of above	18.3	14.6	12.9	23.6	25.1	23.5
3 - Revised estimates of Aggregate National Export Earnings Extended	152.9	168.4	156.8	178.2	205.6	213.6
4 - Price Index of Imports excluding imported intermediate inputs into exports	100.0	102.9	106.2	103.7	103.6	103.3
5 - Constant dollar value of revised estimates above	152.9	163.6	147.6	171.8	198.4	206.8
6 - Revised Extended National Capacity to Import	100.0	107.0	96.5	112.3	129.8	135.3
7 - Extended National Capacity to Import as developed in the present study (item 50-11)	100.0	103.8	93.3	113.7	130.1	134.0

SOURCES OF DATA

The above table is a revision of Table 50 which results from the underestimation of imported intermediate inputs into exports. (Item 40-2). As a result, items 40-10, 50-1, and 50-8 are assumed to be overestimated. The values shown under Item 2 in the above table were derived at as explained in Table 23 under the heading Sources of Data.

APPENDIX VII

- A -

DISTRIBUTION OF THE VALUE OF EXPORTS OF DOMESTIC PRODUCE AND SERVICES OVER THE EXPORTING INDUSTRIES

- B -

DETAILED TABLES SHOWING CALCULATIONS FOR ALL CAPACITY TO IMPORT INDEXES

TABLE 25

TRINIDAD AND TOBAGO
VALUE OF EXPORT OF DOMESTIC PRODUCE

$ W. I. '000

Exporting Industries	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Merchandise:											
111 - Sugar and Rum	29,697.2	32,451.7	27,035.1	32,351.7	32,697.1	33,969.5	39,281.3	47,103.0	37,260.8	51,166.5	49,965.9
113 - Petroleum	194,266.2	213,543.2	263,348.0	315,507.4	341,340.8	366,721.4	400,686.4	503,059.6	507,156.8	536,392.8	588,409.3
114 - Other Minerals	2,948.4	3,327.1	3,012.7	3,579.8	2,501.4	3,297.8	4,406.5	3,950.2	3,805.6	3,657.7	4,525.2
115 - Export Agriculture	21,243.9	16,724.1	15,290.5	14,829.0	22,463.4	16,793.0	16,490.8	12,462.0	16,066.1	17,852.8	14,669.7
121 - Domestic Agriculture	1,275.3	2,636.6	2,049.7	1,953.4	1,703.2	1,059.6	1,968.7	1,524.3	1,355.2	1,110.7	1,270.4
122 & 132 Manufacturing	7,049.6	9,529.9	10,253.4	10,474.3	11,657.9	12,608.8	13,172.9	10,870.1	13,472.1	13,841.8	26,739.3
Sum-total: All exporting industries (1)	256,480.6	278,212.6	320,989.4	378,695.6	412,363.8	434,450.1	476,006.6	578,969.2	579,116.6	624,022.3	685,579.8

P.T.O.

TABLE 25 (Continued..)

TRINIDAD AND TOBAGO

VALUE OF EXPORTS OF DOMESTIC PRODUCE

$ W.I. mn.

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Published totals: exports of domestic produce (entered for comparisons with previous series)	(257.2)	(279.0)	(322.0)	(380.0)	(412.7)	(434.9)	(476.4)	(579.5)	(579.6)	(624.6)	(686.2)
											$ W.I. mn.
Services:											
133 - Tourism	6.2	8.4	10.0	12.1	13.7	14.8	15.2	16.3	17.5	18.7	19.9
138 - Public Utilities (2)	2.1	2.1	2.6	2.2	2.8	3.3	3.7	17.8	22.8	25.9	25.4
- Other miscellaneous services	22.8	23.1	27.8	38.1	40.5	38.4	41.5	70.1	66.9	30.8	81.2
	31.1	33.6	40.4	52.4	57.0	56.5	60.4	104.2	107.2	75.4	126.5
Total: Exports of Domestic Produce and Services	288.3	312.6	362.4	432.4	469.7	491.4	536.8	683.7	686.8	700.0	812.7

P.T.O.

TRINIDAD AND TOBAGO
VALUE OF EXPORTS OF DOMESTIC PRODUCE

SOURCES:

Merchandise exports: Overseas Trade publications - Trinidad and Tobago according to description of sectors as per Appendix II.

Total exports of Services: Difference between exports of goods and services on the one hand, and merchandise exports (domestic plus foreign produce) on the other hand. - As per Annual Statistical Digest 1965 and prior issues.

Services: Tourism and Public Utilities: figures obtained from Central Statistical Office - Government of Trinidad and Tobago.

Other miscellaneous services: entered as a residual.

FOOTNOTES:

1 - These totals differ slightly from those shown on the next line (from Overseas Trade publications) due to the exclusion from our computations of SITC group 9 as well as certain small items under Stores and Bunkers.

2 - From 1954 to 1960, figures relate to Port Authority and Post Office revenues only.
From 1961 onward, revenues from British West Indies Airlines are also included.

TRINIDAD AND TOBAGO

TABLE 30

DOMESTIC CAPACITY TO IMPORT
AGGREGATE INDEX

$ W.I. mn.

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
30-1 Value of Exports of Domestic Produce	257.2	279.0	322.0	380.0	412.7	434.9	476.4	579.5	579.6	624.6	686.2
20-2 Exports of services	31.1	33.6	40.4	52.4	57.0	56.5	60.4	104.2	107.2	75.4	126.5
30-3 Value of Exports of Goods and Services	288.3	312.6	362.4	432.4	469.7	491.4	536.8	683.7	686.8	700.0	812.7
30-4 Price[1] index of Imports	100.0	104.6	107.4	111.1	107.3	105.5	116.3	129.5	132.6	126.8	129.0
30-5 Constant Dollar Value of Exports	288.3	289.9	337.4	389.2	437.8	465.8	461.6	528.0	517.9	552.0	630.0
30-6 Domestic Capacity to Import	100.0	103.7	117.0	135.0	151.8	161.6	160.1	183.1	179.6	191.5	218.5

- Current Values under 30-3 divided by index under 30-4

Series under 30-5 converted to relatives with base-year 1954=100.

TRINIDAD AND TOBAGO

DOMESTIC CAPACITY TO IMPORT AGGREGATE INDEX

SOURCES OF DATA:

30-1 and 30-3: Government of Trinidad and Tobago - Central Statistical Office Annual Statistical Digest - 1965 and prior issues.

30-2: Difference between 30-3 and 30-1

30-4: Appendix IV

FOOTNOTE (1)

Although this is really an index of average unit values, the term price index is used in this and other tables for the sake of convenience.

TABLE 31

TRINIDAD AND TOBAGO
DOMESTIC CAPACITY TO IMPORT
III - SUGAR AND RUM

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
33-1	Value of exports by this industry (domestic produce)	29,697.2	32,451.7	27,035.1	32,351.7	32,697.1	33,969.5	39,281.3	47,103.0	37,260.8	51,166.5	49,965.
32-2	Price Index of Imports	100.0	104.6	107.4	111.1	107.3	105.5	116.3	129.5	132.6	126.8	129.0
33-3	Constant dollar value of exports: Current values under 33-1 divided by index under 33-2	29,697.2	31,024.6	25,172.3	29,119.4	30,472.6	32,198.6	33,775.8	36,373.0	28,100.1	40,352.1	38,733.2
33-4	Domestic Capacity to Import Series under 33-3 converted to relatives with 1954=100	100.0	104.5	84.8	98.0	102.6	108.4	113.7	122.5	94.6	135.9	130.4

SOURCES OF DATA:

See Table 32

TABLE 32

TRINIDAD AND TOBAGO
DOMESTIC CAPACITY TO IMPORT
113 - PETROLEUM

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
31-1	Value of exports by this industry (Domestic Produce)	194.3	213.5	263.4	315.5	341.3	366.7	400.7	503.1	507.2	536.4	588.4
31-2	Price index of imports	100.0	104.6	107.4	111.1	107.3	105.5	116.3	129.5	132.6	126.8	129.0
31-3	Constant dollar value of Exports:	194.3	204.1	245.2	284.0	318.1	347.6	344.5	388.5	382.5	423.0	456.1
	Current values under 31-1 divided by index under 31-2											
31-4	Domestic Capacity to Import:	100.0	105.0	126.2	146.2	163.7	178.9	177.3	199.9	196.9	217.7	234.7
	Series under 31-3 converted to relatives with base year 1954 = 100.											

SOURCES OF DATA:

31-1 - Table 23

31-2 - See Table 30, item 30-4

TABLE 33

TRINIDAD AND TOBAGO
DOMESTIC CAPACITY TO IMPORT
114 - OTHER MINERALS

W.I. $ '000

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
32-1	Value of exports by this industry (domestic produce)	2,948.4	3,327.1	3,012.7	3,579.8	2,501.4	3,297.8	4,406.5	3,950.2	3,805.6	3,657.7	4,525.2
32-2	Price index of Imports	100.0	104.6	107.4	111.1	107.3	105.5	116.3	129.5	132.6	126.8	129.0
32-3	Constant dollar value of exports: Current values under 32-1 divided by index under 32-2	2,948.4	3,180.8	2,805.1	3,222.1	2,331.2	3,125.9	3,788.9	3,050.3	2,870.0	2,884.6	3,507.9
32-4	Domestic Capacity to Import: Series under 32-3 converted to relatives with base-year 1954 = 100.	100.0	107.9	95.1	109.3	79.1	106.0	128.5	103.4	97.3	97.8	119.0

SOURCES OF DATA:

See Table 32

TABLE 34

TRINIDAD AND TOBAGO
DOMESTIC CAPACITY TO IMPORT
115 - EXPORT AGRICULTURE

W. I. $ '000

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
34-1	Value of exports by industry (Domestic produce)	21,243.9	16,724.1	15,290.5	14,829.0	22,463.4	16,793.0	16,490.8	12,462.0	16,066.1	17,852.8	14,669.7
34-2	Price index of Imports	100.0	104.6	107.4	111.1	107.3	105.5	116.3	129.5	132.6	126.8	129.0
34-3	Constant dollar value of exports: Current values under 34-1 divided by index under 34-2	21,243.9	15,988.6	14,237.0	13,347.4	20,935.1	18,761.1	14,179.5	9,623.2	12,116.2	14,079.5	11,371.9
34-4	Domestic Capacity to Import; Series under 34-3 converted to relatives with 1954=100	100.0	75.3	67.0	62.8	98.5	88.3	66.7	45.3	57.0	66.3	53.5

SOURCES OF DATA:

See Table 32

TABLE 35

TRINIDAD AND TOBAGO
DOMESTIC CAPACITY TO IMPORT
121 - DOMESTIC AGRICULTURE

W. I. $ '000

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
35-1 Value of exports by industry (Domestic produce)	1,275.3	2,636.6	2,049.7	1,953.4	1,703.2	1,059.6	1,968.7	1,524.3	1,355.2	1,110.7	1,270.4
35-2 Price index of Imports	100.0	104.6	107.4	111.1	107.3	105.5	116.3	129.5	132.6	126.8	129.0
35-3 Constant dollar value of exports: Current calues under 35-1 divided by index under 35-2	1,275.3	2,520.6	1,908.5	1,758.2	1,587.3	1,004.4	1,692.8	1,177.1	1,022.0	875.9	984.8
35-4 Domestic Capacity to Import: Series under 35-3 converted to relatives with 1954=100	100.0	197.6	149.6	137.9	124.5	78.8	132.7	92.3	80.1	68.7	77.2

SOURCES OF DATA:

See Table 32

TABLE 36

TRINIDAD AND TOBAGO
DOMESTIC CAPACITY TO IMPORT
122 & 132 - MANUFACTURING

W. I. $ '000

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
36-1	Value of exports by industry (Domestic produce)	7,049.6	9,529.9	10,253.4	10,474.3	11,657.9	12,608.8	13,172.9	10,870.1	13,472.1	13,841.8	26,739.3
36-2	Price index of Imports	100.0	104.6	107.4	111.1	107.3	105.5	116.3	129.5	132.6	126.8	129.0
36-3	Constant dollar value of exports: Current values under 36-1 divided by index under 36-2	7,049.6	9,110.8	9,546.9	9,427.8	10,864.8	11,951.5	11,326.7	8,393.9	10,160.0	10,916.2	20,728.1
36-4	Domestic Capacity to Import: Series under 36-3 converted to relatives with 1954=100	100.0	129.2	135.4	133.7	154.1	169.5	160.7	119.1	144.1	154.8	294.0

SOURCES OF DATA:

See Table 32

TABLE 37

TRINIDAD AND TOBAGO
DOMESTIC CAPACITY TO IMPORT
133 - TOURISM

W. I. $ mn.

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
37-1 Value of Exports by this industry	6.2	8.4	10.0	12.1	13.7	14.8	15.2	16.3	17.5	18.7	19.9
37-2 Price Index of Imports:	100.0	104.6	107.4	111.1	107.3	105.5	116.3	129.5	132.6	126.8	129.0
37-3 Constant dollar value of Exports:											
Current values under 37-1 divided by index under 37-2	6.2	8.1	9.3	10.9	12.8	14.1	13.1	12.6	13.2	14.7	15.4
37-4 Domestic Capacity to Import: Series under 37-3 converted to relatives with 1954=100	100.0	130.6	150.0	175.8	206.4	227.4	211.3	203.2	212.9	237.1	248.4

SOURCES OF DATA:

See Table 32

TABLE 38

TRINIDAD AND TOBAGO
DOMESTIC CAPACITY TO IMPORT
138 - PUBLIC UTILITIES

W. I. $ mn.

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
38-1 Value of exports by this industry	2.1	2.1	2.6	2.2	2.8	3.3	3.7	17.8[1] (3.96)	22.8	25.9	25.4
38-2 Price index of Imports	100.0	104.6	107.4	111.1	107.3	105.5	116.3	129.5	132.6	126.8	129.0
38-3 Constant dollar value of exports: Current values under 38-1 divided by index under 38-2	2.1	2.0	2.4	2.0	2.6	3.1	3.2	13.7 (3.1)	17.2	20.4	19.7
38-4 Domestic Capacity to Import Series under 38-3 converted to relatives with 1954=100.	100.0	95.2	114.3	95.2	123.8	147.6	152.4	(100.0) 147.6	(125.5) 185.2	(148.9) 219.8	(143.8) 212.2

NOTES: (1) Until 1960, these relate mainly to revenues from the operations of the Port Authority and the Post Office.

From 1961 onwards, revenues from B.W.I.A. are also included. For this reason, the Domestic Income Terms of Trade were first calculated for the period 1954 to 1961 inclusive, based on an estimated revenue of W.I. $3.96 mn in 1961. A separate Domestic Income Terms of Trade was calculated for the period 1961 to 1964 with base year 1961 and using values of exports as shown; this index is also shown between brackets. Finally, the two indexes were linked together.

SOURCES OF DATA:

See Table 32.

TABLE 40

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
AGGREGATE INDEX

W. I. $ mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
40-1	Value of exports of goods and services[1]	288.3	312.6	362.4	432.4	469.7	491.4	536.8	683.7	686.8	700.0	812.7
40-2 minus:	Imported intermediate inputs embodied in exports	73.0	84.9	89.0	97.8	128.2	142.6	168.1	258.4	270.7	293.0	363.6
40-3	Net value of exports of goods and services	215.3	227.7	273.4	334.6	341.5	348.8	368.7	425.3	416.1	407.0	449.1
40-4 plus:	Gross factor income payments to Trinidad[2]	-	-	-	-	-	-	-	-	-	-	-
40-5 plus:	Gross private remittances to Trinidad[2]	-	-	-	-	-	-	-	-	-	-	-
40-6 minus:	Gross factor income payments made abroad.[2]	-	-	-	-	-	-	-	-	-	-	-
40-7 minus:	Gross remittances made abroad.[2]	-	-	-	-	-	-	-	-	-	-	-

P.T.O.

TRINIDAD AND TOBAGO

TABLE 40 (Continued)

NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
AGGREGATE INDEX

W.I. $ mn

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
40-8 minus: Capital consumption provisions of foreign-owned firms	30.8	37.1	46.3	40.2	53.1	60.8	78.9	80.7	89.5	94.6	99.9
40-9 minus: Servicing and amortization payments of the Public External Department.	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	5.3	7.0

P. T. O.

TABLE 40
(Continued)

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
AGGREGATE INDEX

$. W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
	SUB-TOTAL	182.5	188.6	225.1	292.4	286.4	286.0	287.8	342.6	323.6	307.1	347.6
40-4a	plus: Net Factor income payments to Trinidad.[2]	-24.7	-34.8	-68.7	-108.6	-89.2	-117.6	-89.0	-114.3	-113.6	-119.8	-125.6
40-5a	plus: Net Remittances to Trinidad.[2]	+ 0.2	+ 0.4	+ 0.6	+ 0.7	+ 0.9	+ 1.0	+ 1.8	- 2.1	- 1.6	+ 1.4	+ 1.3
40-10	National Export Earnings: Sum-total of all items above	158.0	154.2	157.0	184.5	198.1	169.4	200.6	226.2	208.4	188.7	223.3
40-11	Price index of imports excluding imported intermediate inputs into exports	100.	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.6
40-12	Constant dollar value of net value of exports Value series index 40-12 divided by index under 40-3	215.3	221.3	257.4	322.7	329.6	337.6	310.6	283.9	272.7	305.1	343.8

TABLE 40
(Continued)

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
AGGREGATE INDEX

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
40-13	Constant dollar value of national export earnings: Value series index 40-10 divided by index under 40-11	158.0	149.8	147.8	177.9	191.2	164.0	169.0	151.0	136.6	141.4	171.0
40-14	Net Domestic Capacity to Import Series under 40-12 converted to relatives with base-year 1954=100.	100.	102.8	119.6	149.9	153.1	156.8	144.3	131.9	126.7	141.7	159.6
40-15	Current National Capacity to Import Series under 40-13 converted to relatives with base-year 1954=100.	100.	94.8	93.5	112.6	121.0	103.8	107.0	95.6	86.4	89.5	108.2

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
AGGREGATE INDEX

SOURCES OF DATA:

40-1 Overseas Trade and Annual Statistical Digest Publications

40-4a Annual Statistical Digest 1965 and prior issues

40-5a Ibid

40-2 Estimates developed for this study; the method is described in Appendix III.

40-8 Estimates developed for this study as the sum total of items 41-7, 43-7, and 46-7; foreign ownership in other industries is not large enough to develop meaningful estimates of capital consumption - provisions of foreign owned firms in those industries.

40-9 Figures obtained from the Central Statistical Office - Government of Trinidad and Tobago.

40-11 Index developed for this study; the method is described in Appendix IV.

40-12 Constant dollar value of net value of exports - value series index 40-3 divided by index under 40-11.

40-14 Net Domestic Capacity to Import - Series under 40-12 converted to relatives with base year 1954 = 100.

FOOTNOTES:

1 - A breakdown into merchandise exports and services may be found under item 30-1.

2 - No figures have been entered under items 40-4, 40-5, 40-6, 40-7. Instead, the net flows have been entered under items 40-4a and 40-5a.

TABLE 41

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
III - SUGAR AND RUM

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
43-1	Value of exports by this industry (domestic produce)	29.7	32.4	27.0	32.3	32.7	34.0	39.3	47.1	37.3	51.2	50.0
43-2 minus:	Imported intermediate inputs embodied in exports	1.4	1.9	2.0	1.8	2.0	1.8	1.5	1.9	1.7	1.7	1.8
43-3	Net value of exports by this industry	28.3	30.5	25.0	30.5	30.7	32.2	37.8	45.2	35.6	49.5	48.2
43-4 minus:	Remitted and retained profits of foreign owned enterprises in this industry	4.3[e]	5.0	2.8	4.6	3.6	2.4	5.7[e]	7.3	5.1	7.5[e]	6.5[e]
43-5 minus:	Remitted salaries by foreign-owned firms in this industry.	.1	.2	.1	.2	.2	.4	.3	.3	.4	.5	.5
43-7 minus:	Capital consumption provisions of foreign owned firms in the industry.	1.9	1.3	1.2	1.2	1.4	1.3	1.4	2.2	2.7	2.7[e]	2.9[e]
43-8	National Export Earnings of this Industry	22.0	22.1	20.9	24.5	25.5	28.1	30.4	35.4	27.4	38.8	38.3

TABLE 41
(Continued)

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
111 - SUGAR AND RUM

$ W.I. mn

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
43-9	Price index of imports excluding imported intermediate inputs going into exports	100.0	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.6
43-10	Constant dollar value of net value of exports by this industry	28.3	29.6	23.5	29.4	29.6	31.2	31.8	30.2	23.3	37.1	36.9
43-11	Constant dollar value of national export earnings of this industry	22.0	21.5	19.7	23.6	24.6	27.2	25.6	23.6	17.9	29.1	29.3
43-12	Net Domestic Capacity to Import of this industry	100.	104.6	83.0	103.9	104.6	110.2	112.4	106.7	82.3	131.1	130.4
43-13	Current National Capacity to Import for this industry	100.0	97.7	89.5	107.3	111.8	123.6	116.4	107.3	81.4	132.3	133.2

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
111 - SUGAR AND RUM

SOURCES OF DATA:

43-1, 43-2, 43-3, 43-7 to 43-12 See Tables 40 and 43 (Sources of Data).

43-4 Years 1955 to 1959 - Report of the Board of Inquiry into a Trade Dispute in the Sugar Industry of Trinidad - December, 1960 - Government Printing Office, Trinidad, W.I. - 1961, page 4.

Years 1961 and 1962 Obtained from unpublished data

Years 1954, 1960, 1963 and 1964 Own estimates based on figures for other years.

43-5 See Table 43.

43-6 Non-existent

43-7 See item 41-7

TABLE 42

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
114 - OTHER MINERALS

$ W.I. '000

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
42-1	Value of exports by this industry (domestic produce)	2,948.4	3,327.1	3,012.7	3,579.8	2,501.4	3,297.5	4,406.5	3,950.2	3,805.6	3,657.7	4,525
42-2 minus:	Imported intermediate inputs embodied in exports	4.9	6.1	4.1	9.5	15.2	14.2	18.9	17.6	15.0	7.4	27.8
42-7	Net Value of exports and National export earnings of this industry	2,943.5	3,321.0	3,008.6	3,570.3	2,486.2	3,283.6	4,387.6	3,932.6	3,790.6	3,650.3	4,497.4
42-8	Price index of imports excluding imported intermediate inputs going into exports	100.	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.6
42-9	Constant dollar value of national export earnings of this industry	2,943.5	3,227.4	2,832.9	3,442.9	2,399.8	3,178.7	3,696.4	2,625.2	2,484.0	2,736.3	3,443.6
42-10	Net Domestic and Current National Capacity to Import for this industry	100.	109.6	96.2	117.0	81.5	108.0	125.6	89.2	84.4	93.0	117.0

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
114 - OTHER MINERALS

SOURCES OF DATA

42-1 Copied from Table 33, item 32-1

42-2 Estimates developed for the present study; see Appendix III

42-3 to 42-6 These headings would correspond to those in Table 43, items 41-3 to 41-6. These items have been omitted as there is no significant foreign ownership in this industry.

42-7 Sum total of items 42-1 and 42-2

42-8 and 42-10 See corresponding items 40-11, 40-13 and 40-15 in Table 40.

TABLE 43

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
113 - PETROLEUM

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
41-1	Value of exports by this industry (domestic produce)	194.3	213.5	263.4	315.5	341.3	366.7	400.7	503.1	507.2	536.4	588.4
41-2 minus:	Imported intermediate inputs embodied in exports	67.1	76.6	80.6	89.6	117.7	132.2	158.2	247.3	260.5	283.2	346.3
41-3	Net Value of exports by this industry (41-1 minus 41-2)	127.2	136.9	182.8	225.9	223.6	234.5	242.5	255.8	246.7	253.2	242.2
41-4 minus:	Remitted and retained profits of foreign-owned enterprises in this industry.	27.5	29.7	64.4	103.8	68.6	94.4	70.0[e]	106.5	105.2	102.0[e]	105.0[e]
41-5 minus:	Remitted salaries by foreign-owned firms in this industry	1.1	1.7	1.5	1.6	1.8	3.1	2.7	3.0	3.1	4.2	4.3
41-6 minus:	Foreign rents and royalties	1.5[e]	1.6	1.6	2.9	3.6	3.8	4.3[e]	4.8[e]	5.2[e]	5.7[e]	6.2[e]
41-7 minus:	Capital consumption provisions of foreign-owned firms in this industry.	27.2	33.9	43.0	36.8	48.8	56.2	73.1	72.8	79.9	80.0[e]	82.2[e]

P. T. O.

TABLE 43
(Continued)

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
113 - PETROLEUM

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
41-8	National Export earnings of this industry	71.4	70.0	74.3	80.0	100.9	77.0	92.4	68.6	53.3	61.3	44.5
41-9	Price index of imports excluding imported intermediate inputs going into exports	100.	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.6
41-10	Constant dollar value of the net value of exports by this industry	127.2	133.0	172.1	217.8	215.8	227.0	204.3	170.8	161.7	189.8	185.4
41-11	Constant dollar value of national export earnings of this industry	71.4	68.0	68.1	77.9	97.4	74.5	77.8	45.8	34.9	45.9	34.1
41-12	Net Domestic Capacity to Import of this Industry	100.0	104.5	135.3	171.2	169.6	178.4	160.5	134.2	127.0	149.2	145.7
41-13	Current National Capacity to Import for this industry	100.0	95.2	95.4	109.1	136.4	104.3	109.0	64.1	48.9	64.3	47.8

P. T. O.

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
113 - PETROLEUM

SOURCES OF DATA:

41-1 Copied from Table 32; item 31-1

41-2 Estimates developed for the present study; the method is explained in Appendix III.

41-4 and 41-6 Estimates developed from unpublished material. Note that our estimates are consistent with the series 40-4a (See Table 40) of net factor payments abroad published in Annual Statistical Digest, 1965, especially if we take into account the fact that petroleum is by far the largest source of the outflow of property incomes.

41-5 Totals for the economy obtained from the Central Statistical Office. In view of the relative unimportance of this item, the total has been split up rather arbitrarily with approximately 90% being accounted for by the Petroleum industry and 10% by Sugar and Rum.

41-7 The National Income of Trinidad and Tobago 1952 to 1962 - Central Statistical Office, Government Trinidad and Tobago, 1964, Table 15, Page 23.

41-9 Index developed for this study, See Appendix IV.

41-8, 41-9, 41-10, 41-11, 41-12, and 41-13 See corresponding items 40-10 to 40-15 in Table 40.

FOOTNOTES:

e - Designates own estimates where gaps occurred in the data used (either published or unpublished).

TABLE 44

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
II:- EXPORT AGRICULTURE

$ W.I. '000

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
44-1	Value of exports by this industry (Domestic produce)	21,243.9	16,724.1	15,290.5	14,829.0	22,463.4	16,793.0	16,490.8	12,462.0	16,066.1	17,852.8	14,669.7
44-2 minus:	Imported intermediate inputs embodied in exports	590.9	871.4	1,121.2	647.0	1,512.9	732.4	745.0	792.2	967.0	875.9	687.3
44-7	Net value of exports and National Export Earnings of this industry.	20,653.0	15,852.7	14,169.3	14,182.0	20,950.5	16,060.6	15,745.8	11,669.8	15,099.1	16,976.9	13,982.4
44-8	Price index of imports excluding imported intermediate inputs going into exports	100.0	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.6
44-9	Constant dollar value of national export earnings of this industry	20,653.0	15,405.9	13,342.1	13,676.0	20,222.5	15,547.5	13,265.2	7,790.2	9,894.6	12,726.3	10,706.3
44-10	Net Domestic and Current National Capacity to import for this industry	100.0	74.6	64.6	66.2	97.9	75.3	64.2	37.7	47.9	61.6	51.8

SOURCES OF DATA:

See Table 42 - corresponding items.

TABLE 45

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
121 - DOMESTIC AGRICULTURE

$ W.I. '000

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
45-1	Value of exports by this industry (Domestic produce)	1,275.3	2,636.6	2,049.7	1,953.4	1,703.2	1,059.6	1,968.7	1,524.3	1,355.2	1,110.7	1,270.4
45-2 minus:	Imported intermediate inputs embodied in exports	78.7	91.3	97.7	93.9	121.2	133.3	119.9	141.5	127.5	163.3	214.5
45-7	Net value of exports and National Export Earnings of this industry	1,196.6	2,545.3	1,952.0	1,859.5	1,582.0	926.3	1,848.8	1,382.8	1,227.7	947.4	1,055.9
45-8	Price index of imports excluding imported intermediate inputs going into exports	100.0	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.5
45-9	Constant dollar value of national export earnings of this industry	1,196.6	2,473.6	1,838.0	1,793.1	1,527.0	896.7	1,557.5	923.1	804.5	710.2	808.5
45-10	Net Domestic and Current National Capacity to Import of this industry	100.0	206.7	153.6	149.8	127.6	74.9	130.2	77.1	67.2	59.3	67.6

SOURCES OF DATA:

See Table 42 - corresponding items.

TABLE 46

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
122 & 132 - MANUFACTURING

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
46-1	Value of exports by this industry (Domestic produce)	7.0	9.5	10.2	10.5	11.7	12.6	13.2	10.9	13.5	13.8	26.7
46-2 minus:	Imported intermediate inputs embodied in exports	3.4	5.0	4.7	5.1	6.2	6.8	6.7	5.9	6.7	6.3	13.8
46-3	Net value of exports by this industry	3.6	4.5	5.5	5.4	5.5	5.8	6.5	5.0	5.8	7.5	12.9
46-4 minus:	Remitted and retained profits of foreign-owned enterprises in this industry	5.1	6.2	6.6	6.8	7.6	8.2	8.6	7.2	9.6	9.0	10.9
46-7 minus:	Capital consumption provisions of foreign-owned firms in this industry.	1.7	1.9	2.1	2.2	2.9	3.3	4.0	5.8	6.4	6.8	7.2
46-8	National Export Earnings of this industry	-3.2	-3.6	-3.2	-3.6	-5.0	-5.7	-6.1	-8.0	-9.2	-8.3	-5.2
46-9	Price index of imports excluding imported intermediate inputs going into exports	100.0	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.6
46-10	Constant dollar value of net value of exports by this industry	3.6	4.4	5.2	5.2	5.3	5.6	5.5	3.3	3.8	5.6	9.8

TABLE 46
(Continued)

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
122 & 132 - MANUFACTURING

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
46-11	Constant dollar value of national export earnings of this industry	-3.2	-3.7	-3.4	-3.7	-5.2	-5.9	-7.2	-12.0	-14.0	-11.1	-6.8
46-12	Net Domestic Capacity to Import of this industry	100.	121.8	144.0	144.0	146.8	155.1	152.3	91.4	105.2	155.1	255.5
46-13	Current National Capacity to Import for this industry	Not shown to avoid confusion with other increasing indexes (1).										

SOURCES OF DATA:

46-4 Own estimates developed for this study from unpublished data

46-7 Developed for this study from unpublished data.

All other items - See Tables 43 and 40.

FOOTNOTES:

(1) - The increasing foreign exchange deficit under item 46-11, converted into an index, would result in the following series: 100.0, 115.6, 106.2, 115.6, 162.9, 184.4, 225.4, 379.0, 437.5, 346.9 and 212.5.

TRINIDAD AND TOBAGO
NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT
133 - TOURISM

TABLE 47 $ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
47-1	Value of exports by this industry	6.2	8.4	10.0	12.1	13.7	14.8	15.2	16.3	17.5	18.7	19.9
47-2 minus:	Imported intermediate inputs embodied in exports	.4	.3	.3	.3	.3	.5	.4	.6	.5	.4	.5
47-7	Net value of exports and National Export Earnings of this industry	5.8	8.1	9.7	11.8	13.4	14.3	14.8	15.7	17.0	18.3	19.4
47-8	Price index of imports excluding imported intermediate inputs going into exports	100.0	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.6
47-9	Constant dollar value of national export earnings of this industry	5.8	7.9	9.1	11.4	12.9	13.8	12.5	10.5	11.1	13.7	14.8
47-10	Net Domestic and Current National Capacity to Import for this industry	100.0	136.2	156.9	196.5	222.4	237.9	215.5	181.0	191.4	236.2	255.2

SOURCES OF DATA:

47-1 Obtained from the Central Statistical Office - Government of Trinidad and Tobago

All other items - See Tables 43 and 42.

TRINIDAD AND TOBAGO

NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT

TABLE 48 — 138 - PUBLIC UTILITIES — $ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
48-1	Value of exports by this industry[1]	2.1	2.1	2.6	2.2	2.8	3.3	3.7	17.8 (3.96)[2]	22.8	25.9	25.4
48-2 minus:	Imported intermediate inputs embodied in exports	.1	.1	.1	.2	.3	.4	.3	.5	.3	.3	.3
48-7	Net value of exports and National Export Earnings of this industry	2.0	2.0	2.5	2.0	2.5	2.9	3.4	17.3 (3.46)[2]	22.5	25.6	25.1
48-8	Price index of imports excluding imported intermediate inputs going into exports	100.0	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.6
48-9	Constant dollar value of national export earnings of this industry	2.0	1.9	2.3	1.9	2.4	2.8	2.9	(2.3)[2] 11.5	14.7	19.2	19.2
48-10	Net Domestic and Current National Capacity to Import for this industry	100.0	95.0	115.0	95.0	120.0	140.0	145.0	(100.)[2] 115.0	(127.8) 146.9	(166.9) 191.9	(166.9) 191.9

SOURCES OF DATA:

48-1 Obtained from the Central Statistical Office - Government of Trinidad and Tobago.
All other items - See Tables 43 and 42.

FOOTNOTES:

1 - From 1961 onwards, revenues from B.W.I.A. are included.
2 - Due to interruption in the homogeneity of the series (48-1) in 1961, separate indexes have been calculated for the periods 1954 to 1961 and 1961 to 1964 after which both series were linked together. The figures between brackets show the values or index numbers before the linkage process.

TABLE 50

TRINIDAD AND TOBAGO
EXTENDED NATIONAL CAPACITY TO IMPORT
AGGREGATE INDEX

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
50-1	National Export Earnings	158.0	154.2	157.0	184.5	198.1	169.4	200.6	226.2	208.4	188.7	223.3
50-2 plus:	Capital inflows of foreign-owned businesses and for the purchase of real estate	40.5	35.5	49.7	101.5	71.6	108.9	76.0	60.5	73.4	76.4	67.7
50-3 minus:	Net increase in overseas balances of local banks	7.3	-3.1	9.6	40.4	-15.4	5.6	-14.4	-22.9	-16.0	25.3	-34.9
50-4 minus:	Net increase in overseas investments of Life Insurance companies	3.2	4.7	4.6	4.9	5.5	2.1	6.8	6.1	6.1	5.4	5.4
50-5 plus:	Unused portion of Government borrowing	20.0	15.7	8.8	.6	-6.6	12.1	7.0	-4.4	6.5	35.9	64.3
50-6 minus:	Unrecorded overseas investments and errors	18.8	1.2	10.0	.9	- .1	1.9	.6	-5.0	- .5	n.a.	n.a.
50-7 minus:	Imported capital equipment and materials used to materialize investments	18.0	19.6	21.6	38.6	42.4	43.7	40.0	33.0	35.5	36.0	34.0
50-8	Extended National Export Earnings	171.2	183.0	169.7	201.8	230.7	237.1	250.6	270.2	263.2	234.3	350.8

TABLE 50
(Continued)

TRINIDAD AND TOBAGO
EXTENDED NATIONAL CAPACITY TO IMPORT
AGGREGATE INDEX

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
50-8	Extended National Export Earnings (copied from previous page)	171.2	183.0	169.7	201.8	230.7	237.1	250.6	270.2	263.2	234.3	350.8
50-9	Price index of imports excluding intermediate inputs into exports	100.0	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.6
50-10	Constant dollar value of Extended National Export Earnings	171.2	177.8	159.8	194.6	222.7	229.5	211.1	180.4	172.5	175.6	268.6
50-11	Extended National Capacity to Import	100.0	103.8	93.3	113.7	130.1	134.0	123.3	105.4	100.7	102.6	156.9

SOURCES OF DATA:

50-1 Table 40, item 40-10

50-2 Trinidad and Tobago, 1965 I.M.F. Report - Tables and Worksheets, Table L, page 14

50-3, 50-4, and 50-6 The National Income of Trinidad and Tobago - 1952 to 1962; page 5, items 3-11, 3-12 and 3-13 Central Statistical Office, Government of Trinidad and Tobago.

50-5 Calculated for this study as shown in Appendix V

50-7 Estimates developed for this study.

50-8 to 50-11 See corresponding items in Table 40 and references to sources of data.

THE MINERAL EXPORT SECTOR

Petroleum

STATISTICAL TABLES

Mineral Export Sector

Petroleum

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Mineral Export Sector

Petroleum - (cont'd)

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THE PETROLEUM INDUSTRY

Technology and Development of world petroleum.

In essence, petroleum consists of a compound of hydrogen and carbon in liquefied form. When subjected to processes of refining the molecules of these two elements are rearranged in the form of products which find a large number of uses as illuminants, lubricants, materials for road building and for the production of organic chemicals. But by far the most important use of petroleum products is as fuels for the production of energy.

It is possible for analytic purposes to distinguish five phases in the history of the development of the use of petroleum. Each phase is associated with technological development both within and without the petroleum industry and each one corresponds very roughly to a chronological period. They are the phases of (i) kerosene, (ii) fuel oil, (iii) gasolene, (iv) natural gas, and (v) petrochemicals. As their names imply, each phase is characterised by a major new use for petroleum; though it should be pointed out that natural gas is not a product of crude petroleum but produced jointly with it, and that gasolene remains the single

most important petroleum product to the economics of the industry.

The technological event which gave birth to the petroleum industry was the application, in the United States in 1859,of the techniques of salt well drilling to the recovery of so-called "'rock oil" which had formerly appeared only as seepage and been too scarce to be used for anything other than medicinal purposes. The success of the salt well drilling technique brought to the surface barrels of crude oil of considerable economic value. When subjected to heating, kerosene could be collected at the top to be sold as an illuminant and heavy oil as the residual to be sold as lubricants. The early and rapid growth of the industry in the latter half of the nineteenth century was based on the proliferation of demand for these products. This was induced by the growing popularity of the kerosene lamp as a means of nocturnal lighting and by the rapid growth in the use of engines in the industrialising countries.

The discovery of oil in Texas at the turn of the century brought to the surface a liquid unsuitable for the production of kerosene or lubricants and which had to be used as fuel oil for boilers. It was the marketing

breakthrough for the producers of this crude in the form of contracts to provide fuel for the British Navy that firmly established this as a second major use for petroleum and one that was to continue right up to the present time. The gasolene phase, which can be seen as beginning by the second decade of the twentieth century, was triggered by the technology outside of the industry. This was the emergence and spectacular growth of the automobile industry and the derived demand for gasolene which it generated and continues to generate.

Natural gas frequen tly occurs in association with deposits of crude oil and for most of the industry's life the practice has been to "flare" (i.e. burn into the atmosphere) the bulk of it. In the postwar period however there has been an increasing awareness of the enormous waste resulting from this practice and of the value of natural gas as a source of low-cost power and a raw material in the petrochemicals industry. Power produced from natural gas in certain areas has begun to compete sharply with power produced from petroleum itself, although it appears that for the immediate future petroleum derivatives will continue to dominate the industry.

The petrochemical phase of the industry is also, in the main, a

postwar phenomenon. Before this emergence of the oil industry, coal-tar was the principal raw material in the production of organic chemicals. One of the results of the growing demand for gasolene was a rapid development in the technology of refining in the first decades of the twentieth century. This in turn brought into use techniques which made possible the easy extraction of organic chemicals from both petroleum and natural gas. Thus, after 1940, the bulk of the expansion of the U.S. chemical industry was to be based on petro-chemicals. The growth of this industry has in turn been rapid, as its products - such as drugs, plastics, synthetic rubber and detergents - encounter high output - and income-elasticities of demand under the impact of product and process innovation.

World Output Trends.

The oil industry was in the first instance an almost exclusively U.S. industry. Production began there in the 1860's and major discoveries were made on the Eastern seaboard. Not until near the turn of the century did Russia and the Middle East join the United States as important producers. In the first decade of the present century, the great discoveries of the Texas oilfields were made, thereby assuring continued U.S. predominance in world oil production. At the same time, important strikes were made

in Mexico and Iran. In the 1920's and 1930's, Venezuela joined, then surpassed Mexico as a major producer in the American Hemisphere. That country was destined to become the world's largest exporter, and the third producer after the United States and the Soviet Union. In this inter-war period, too, the discovery and parcelling out of the Middle East oilfields took place.

Table One. World Crude Petroleum Production by Country or Region. Millions of Barrels.

Year.	Total.	U.S.A.	U.S.S.R.	Venezuela	Middle East	Others
1860	0.5	0.5				
1900	149	63	75			10
1940	2150	1353	219	184	103	291
1966	11973	3039	1925	1230	3396	2380
Percent total.						
1860	100	100	-	-	-	-
1900	100	42	50	-	-	8
1940	100	63	10	8	5	14
1966	100	25	16	10	28	21

Source: Republica de Venezuela, Minesterio de Mines e Hidrocarburos Petrolero y otros datos estadisticos. 1966. pp. 151-152.

Since the Second World War, main developments have been the rapid growth of middle eastern production, and the major discoveries in North and Central Africa. Table one sums up the main trends in the production pattern since the emergence of the industry.

World Consumption Trends

The consumption of petroleum has been marked by two underlying factors since the emergence of the industry. One has been the continual and successful competition of petroleum products with coal as a source of energy. The other has been the growth of activities - principally transport - in which oil products have no effective competitors. The high and sustained rate of growth of consumption of oil reflects chiefly these developments.

In the United States the growth of oil consumption was most marked in the first half of the twentieth century. This was the period of rapid growth of the automobile industry and the associated growth of demand for gasolene. Other forms of road transport and the shift of the railroads to oil fuel also stimulated the demand for heavier oil fuels. At the same time, oil cut heavily into coal as the source of generation of electric

power , while the demand for electric power was itself expanding quickly.

In the 1950's , however, the growth of demand for petroleum in the U.S.A. has slowed down and was below that of the trend in demand outside of that country. Basically, this is due to the fact that cost reductions in the production of coal and the transport of natural gas have put oil under new competitive pressure , while oil prices have not been allowed to fall because of protectionist policies. Also, the growth of gasolene demand has slowed down because of the trend to smaller cars, improved engine efficiency reducing gasolene consumption, and reduced growth of average mileage of cars per unit of time. Thus the annual growth rate of consumption in the 1950 decade averaged 4.3 percent only and in the 1960's was projected to average between 2.5 and 3.5 percent.

Outside of the United States, however, the postwar period has seen the highest consumption growth rates. This has been particularly marked in Western Europe, where the proliferation of automobile travel and the substitution of oil for coal in energy production has been in the main a post-Second-World-War phenomenon. The growth of oil consumption there has been aided by the rapid growth of cheap oil supplies from the Middle East and North Africa and the fact that, lacking a domestic crude oil

industry of any size, the Governments of Western Europe have not been concerned with maintaining high prices.

In the countries of Africa, Asia and Latin America, percentage consumption growth rates have been high, although absolute consumption still forms a rather low proportion of the world total. In the centrally-planned economies postwar consumption growth has also been very high, though production of oil in these countries has also grown substantially and exceeds consumption.

Table 2. Production of energy by source; 1955, 1965.

Year	Percent		Total		Total
	Coal	Oil	Gas	Hydroelectric & Nuclear	
1955	54.9	31.2	12.1	1.8	100
1965	42.7	41.3	17.6	2.2	100

Table 3. Demand for petroleum products by product, 1955, 1965.

Year	Percent				Total
	Gasolene	Kerosene, Jet fuel & Distilled fuel oil.	Residual Fuel oil	Others	
1955	35.7	23.7	24.9	15.7	100
1965	28.3	27.7	26.9	17.1	100

Source: Venezuela, Ministerio de Minas e Hidrocarburos:

Table 4. Consumption of Refined products, by country, 1955, 1966, Percent total.

	1955	1966
United States	52.5	35.3
Canada	3.9	3.5
Central and South America	7.7	5.5
Western Europe	15.5	25.5
Centrally Planned Economies	10.1	14.7
Rest of the World	10.3	15.5

Source: Venezuela, Ministry of Mines & Hydro Carbons: Petroleo, 1966.

Tables two, three, and four indicate some of the trends discussed above. They show the continuing substitution of oil for coal as a source of energy over the last decade, to the point where the former is just about equal in importance to the latter. They also show the growth in importance of refined products other than gasolene in the demand for petroleum derivatives, and the relative decline of the United States in petroleum consumption.

Metropolitan Enterprise.

The story of the Caribbean petroleum industry is the story of how metropolitan enterprise incorporated the region into their network of multinational operations.

It is first of all necessary to show the development of the organisation of the industry into its characteristic present-day form. The industry was born in the United States, and the production of crude there was marked by the proliferation of a large number of producers. Under the "'rule of capture" which regulates mineral rights in that country, the oil belongs to the owner of the land where it is brought to the surface, not the owner of the land under which the oil lies as such. In effect, this meant that owners of adjacent oil-bearing properties tried to suck out as much of their neighbour's oil and prevent as much of their own being sucked out by neighbours. This encouraged the rapid growth of a large number of wells over the same oil reservoir and a large number of producers, since the capital required to set up drilling was not extremely large.

It was in the marketing of crude that the basis of monopoly and vertical integration in the industry was laid. John D. Rockefeller left the risky and unstable business of production to the independent entrepreneurs, concentrating instead on securing control over the means of transport of crude to refineries. This control was exercised by acquisition of the railroads, contracting with the owners of independent railroads for the transport of crude, and purchase of the technical innovation of the pipe-

line to control the second most important means of oil transport the moment it became important in the industry.

Rockefeller formed Standard Oil in 1870. From its control over transport, Standard Oil was able to integrate forward into refining and backward into crude production. The former was aided by the fact that the erection of refineries had been haphazard, and well in excess of crude capacity. There was clear need for rationalization to eliminate duplication and make the development of refinery capacity consistent with that of the growth of crude supplies, the delivery of which Standard Oil controlled. Small and weak refiners with varied financial histories were hardly in a position to resist Standard's advance. Further forward integration into the marketing of refined products - especially kerosene - followed naturally. Backward integration for Standard took the form of purchasing producers of crude, but its control at this end was never as complete as that in transport, refining and marketing. Indeed, this was not necessary, as control over the latter was sufficient to assure control over the industry as a whole - for a time.

Standard Oil, therefore, dominated the U.S. industry in the latter part of the nineteenth century. Early in the twentieth century, two

developments were to end its monopoly rule. One was the action of metropolitan Government. In 1911, an anti-trust judgement was entered against the company,dissolving it into no less than thirty-three separate companies. As was to happen later in the case of aluminium, however, this action resulted merely in the substitution of a high degree of oligopoly for the monopoly which had hitherto characterised the industry. Most of Standard's descendants immediately set about completing their own vertical integration by rounding off their capacity at all stages of the industry. When the dust had cleared, four giants had inherited the corporate legacy of Standard Oil. These were Standard Oil of New York, (Socony-Vacuum., or Socony-Mobil Oil), Standard Oil of Indiana, Standard of California, and the largest, Standard Oil of New Jersey. It was Jersey Standard which was to corner the lion's share of Venezuelan reserves and to build a refinery in the Dutch West Indian island of Aruba to process its Venezuelan crude. In 1964, Jersey Standard listed forty-nine principal affiliates, and reported a total revenue of U.S. twelve billion with a net income of just over one billion.

The second development which was to erode the monopoly position of the original Standard Oil within the United States was the emergence

of new producers based on new discoveries of crude. The critical event was the discovery in 1901 of a rich field in Texas, a state in which Standard had no interest. The marriage of these hugh reserves to the financial resources of Andrew Mellon - a banker with experience in oil - gave rise to the Gulf Oil Company. In order to gain the support of the Governor of Texas, one of the leases to the rich field was sold to him, thereby giving rise to a firm which was to become yet another giant - the Texas Company (Texaco).

These six companies - Jersey Standard, Socony-Mobil Oil, Standard of Indiana, Standard of California, Gulf and Texaco, today dominate the international oil industry outside of the centrally-planned economies, together with two non-U.S. companies. These two are Royal Dutch/Shell and British Petroleum.

Interestingly enough, Royal Dutch/Shell can also be said to have emerged out of the Texas strike of 1901. The Shell Transport and Trading Company of London's primary business was, as its name indicates, transport and trading. It contracted with the predecessor company of Gulf to buy a stipulated quantity of oil over a twenty-year period. This was principally for the fuel oil needs of the British Navy. It was not

long before this company followed what one might call "iron law of vertical integration" which in this case meant that in order to assure its supplies of oil it had to have its own crude. Hence, there began energetic exploration on its part within the United States, Mexico and Venezuela. In its search for control of the international oil industry, however, it came into early conflict with the might of Standard Oil. In order to carry on the struggle more effectively, Shell, before the First World War, effected a merger with the Royal Dutch Company which had already found crude in the Dutch East Indies and itself sought and needed support in its battle with Standard Oil. Royal Dutch/Shell was to become a major producer in Venezuela and a minor producer in Trinidad, and an operator of refineries in both these Caribbean countries as well as in the Dutch West Indies.

British Petroleum is the successor to The Anglo-Iranian Oil Co., the company which secured rights over the rich Persian oilfields in the first decade of the twentieth century. This company was formed as a direct result of the strategic interest of metropolitan Government - in this case, that of the United Kingdom. In order to assure its navy of adequate supplies of oil, the U.K. Government purchased a controlling interest in the company, and for almost fifty years Anglo-Iranian

monopolized the oil industry of Iran, which in turn supplied the bulk of the oil requirements of Great Britain. Following the nationalization and denationalization of Iranian oil in the 1950's, the company, which then became BP, diversified its supplies to other Middle East sources, and to Trinidad.

These then, are the giants of the international oil industry - five U.S., one British,and one Anglo-Dutch firm. Together with a much smaller company - Companie Francais des Petroles - they accounted, in 1964, for some eighty percent of crude oil production outside of the U.S.A., and the centrally-planned economies, and seventy percent of refinery throughput. Characteristically, they are large in size, vertically integrated in organisation and international in scope.

Size, Vertical Integration and International operations.

In the industry, size, vertical integration, and international operations go together and complement one another. As we have seen, vertical integration, which emerged early in the industry's life, was essential to firms fighting for survival in and dominance of the industry. The growth of the industry to its present enormous size was induced by the expansion of the motor transport and electricity industries. The

industry's growth took the form principally of the growth of the existing firms rather than the entry of new ones. This was due partly to the existence of economies of scale, partly to the success of these firms in keeping interlopers out.

Economies of scale exist in the production, transport, refining and marketing of petroleum and coincides in most cases with a high degree of capital-intensity, which gives rise to the need for large amounts of capital. The large amount of capital required begins at the stage of exploration and developing production. As one writer pointed out:-

> "In the process of finding oil and developing production, very large amounts of money have first to be gambled on , what may be no more than an experienced geologist's hunch. Even if this gamble pays off, a good deal more money will have to be invested, not only in determining the extent of the field and installing the production facilities. Often, particularly in underdeveloped areas where most drilling goes on, much capital has to be invested in providing transport facilities to move the oil and living accommodation, with some standards of amenity, for the people who will be responsible for getting it out of the ground. A large proportion of the money spent on exploration, especially the early stages of it, tends to be wasted..."
>
> Hartshorn, J., Oil Companies and Governments, Faber and Faber, 1967, p. 60.

Once a well is sunk,and crude is actually found, then production costs per barrel diminish sharply up the limit of the capacity of the

well. Variable costs are extremely low so that the burden of the high fixed costs is spread over larger outputs. Thus, this stage of the industry is characterised by large high-risk capital expenditures, followed by substantial economies of scale, once production begins.

In the transport of crude or refined products, economies of scale exist, particularly for shipping, but also for pipelines. For the former, this is due to the fact that "the containing skin of any receptacle rises as the square of its dimensions, whereas the volume enclosed rises as the cube of them."(1). For pipelines it is due to the fact that the costs - those of the pipeline, and of pumping stations - are virtually fixed, and lowest costs are achieved by using the facilities right up to capacity.

The refining of crude oil too is typically highly-capital-intensive and subject to large economies of scale. Recent trends in technology in the industry, moreover, have had the effect of severely limiting the substitutability of labour for capital in the processes. Hartshorn points out that

> "..in the balancing of certain modern refinery units, it is no longer a question of how many men a given bank of instruments and automatic controllers has replaced. Men

could not do the job at all as it is now set up..." p.74

Finally, in marketing, the organisation of moving the refined products from refineries to consuming centres, the storage of these products, and their distribution to the final consumer in a market that covers a large number of refined products and is highly spread by space, requires significant capital both to enter and to maintain under conditions of rapid growth.

The advantages of size, therefore, attach both to physical facilities in the industry and to the institutional units in it. Economies of scale favour large-scale production in crude, transport, refining and marketing each by itself. This by itself would not confer diseconomies on an industry in which there were large firms in crude production, separate from large firms in refining and large firms in transport, and so on. The existence of large institutional units whose size derives from the marrying of large-scale physical facilities at different stages of the industry within one firm, is due to the needs for large amounts of capital and the economies of vertical integration.

The need for large amounts of capital means that the larger the

firm is the larger the absolute amount of profit (cet. par.) and therefore the greater the extent to which the firm can finance its own expansion, particularly where expansion is needed in some critical area of the firm's operations. Moreover, vertical integration also increases the capacity for self-financing, since profits made at one stage can be utilized for expansion of another stage.

Vertical integration also gives rise to a large size of firm, in the purely aggregative sense that the addition of large-scale facilities to other large-scale facilities makes the firm larger. The economies of vertical integration arise out of assuring that all stages of production can be worked at fullest possible capacity, since each stage is linked institutionally to facilities on the input and the output side. In terms of the jargon of economic theory we might say that the pecuniary external economies yielded by one stage to another are internalised to the firm by means of vertical integration.

The internationalization of operations of national, vertically integrated companies followed naturally out of the need to secure overseas reserves and supplies of crude and overseas markets. In the case of companies based in metropoles which possess no crude - Anglo-

Iranian and Royal Dutch/Shell (Britain and Holland) - the need to be international was actually a condition of their emergence as producers and marketers of crude.

The Caribbean Petroleum Industry

VENEZUELA

Emergence, growth and output trends under metropolitan enterprises

Significant production of oil began in Venezuela in 1917. In its search for overseas crude petroleum under the pressure of the non-existence of the mineral at home, Shell found deposits on eastern Lake Maracaibo. At the end of World War One, the U.S. companies realised they could ignore overseas crude oil only at their peril. Standard of Indiana and Gulf both took up "marine" concessions in the Lake.

Large-scale production in Venezuela was, however, to await the intervention of Standard Oil of New Jersey. Jersey had struck oil in Mexico but in the 1920's production there began to decline. Its negotiations for concessions in Iraq were taking a long time. At the same time,

restrictions on imports of Venezuelan oil to the U.S.A. made it difficult for Standard of Indiana to market its Venezuelan crude. Jersey had the international marketing apparatus to handle this oil, and so persuaded Indiana, in 1932, to give up its Maracaibo concession.

The expansion of Jersey's (Creole) production from these fields was rapid. At the same time, Gulf had discovered a more valuable crude in its own concession, and a deal was made with Jersey itself and with Shell to develop these reserves jointly. A company named Mene-Grande was formed, owned fifty percent by Gulf and twenty-five percent each by Jersey, and Shell, which proceeded to work the newly-discovered crude.

The companies not only were corporate partners in the development of the new find, but also decided to "unitise" their production from the older Lake Maracaibo reserves. In effect, therefore, oil production in Venezuela was planned and controlled jointly by these three corporate units. To the MNC'S, this was necessary for reasons arising out of Venezuelan domestic politics, and for reasons of international marketing.

Within Venezuela itself, the dictator Gomez had died in 1935, and there was the need to adopt a united front in dealing with the more democratic regime which succeeded him. Internationally, there were common interests in two areas. First, on the U.S. market itself on the question of securing as large as possible a quota for imports of Venezuelan fuel oil. And on the European market Venezuelan supplies had to be harmonised with those coming from the Middle East so as to stabilise prices. This was facilitated by the fact that Jersey also collaborated with Shell and Anglo-Iranian in the Middle East.

By the time of the Second World War, these "Big Three" companies were joined by Mobil and Texas Oil. As a result of the high rate of production decided on by these companies, there began an oil boom of rapidly rising output for Venezuela, which lasted virtually without interruption from 1935 to 1960. During a time when world oil output was rising rapidly, Venezuela's share of this output increased from nine to fourteen percent between 1935 and 1950 and maintained this share during the 1950 decade. During the whole twenty-five year period, output increased by six hundred percent. The period thus constituted a veritable "Golden Age" for the Venezuelan oil economy.

Table 5. Venezuela: Production of crude petroleum, 1930-1966

Year.	Production Mn. bbls.	Percent world.	Percent growth	
1930	135	10		
1935	149	9	1930-35	10
1940	184	9	1935-40	23
1945	323	12	1940-45	76
1950	547	14	1945-50	69
1955	787	14	1950-55	44
1960	1042	14	1955-60	33
1965	1268	11	1960-65	22

Source: Petroleo. pp. 152-153.

Table five shows that in the 1960's, however, the rate of growth has not only decelerated, but has fallen behind that of the world as a whole. This has been the result of the coincidence of two main developments: the growth of costs, inclusive of taxes, in Venezuela on the one hand, and the rapid emergence of the Middle East as a source of low-cost crude on the other.

Cost data are extremely difficult to obtain from the petroleum industry, but two facts appear to be established as critical contributing factors to the decline of Venezuelan output relative to Middle Eastern. One is that production costs of Middle East appear to be extremely low, and certainly much lower than Venezuela's. The other is that pressure on the companies to yield a higher and higher share of their income in

taxes has been stronger in Venezuela than in the Middle East. While most of the Middle East was bargaining for a fifty percent tax take, Venezuela in 1957 was taking fifty-two percent of profits in taxes, in 1959, sixty-nine percent, and in 1966, seventy-two percent. Thus

> "It was inevitable that low costs in the Middle East would give it the greater growth; but the increase in Venezuelan revenue per barrel, to the integrated company, had also increased the difference in tax-paid cost".
> Hartshorn, op.cit. p. 303.

The result has been a substitution, incrementally, and in at least one case absolutely, of Middle East crude for Venezuelan in the "input mix" arrangements of the multinational oil companies. The MNCs, in the language of Pure Plantation Economy, were "shifting terrain".

This process is vividly illustrated with reference to the position of Standard of New Jersey, the largest producer in Venezuela, and the biggest of the multinational corporations. Through its one hundred percent ownership of Creole, and its twenty-five percent share in Mene Grande, Jersey controlled forty-nine percent of Venezuelan production in 1955. But Jersey also has direct or indirect access to the rich oilfields of Saudi Arabia, Iran, Iraq, and Kuwait, the four principal producers in the Middle East, who together produced twenty-six percent of world output in 1966. In Saudi Arabia, fourth world

producer after Venezuela, Jersey holds thirty percent in Aramco, the sole concessionaire. This gives it in effect command over an amount of crude in 1966 equal to about one-quarter of its Venezuelan production.

Between 1955 and 1966, Saudi Arabian production, in which Jersey has a constant share, grew by one hundred and twenty-five percent, while its Venezuelan production grew by twenty-six percent only. In quantity terms, Jersey's share in Saudi Arabian production grew by 134 MN bbl. per year between the two years, while its Venezuelan production grew by 99 MN bbl. only.

Jersey also has part ownership of the companies producing in Iran, and Iraq, and buys crude from the company producing in Kuwait. The group of companies headed by Jersey, and including Texaco, Shell, Gulf, Socony-Mobil Oil, and British Petroleum, controls virtually all of the production of these four Middle East countries. And the above companies, with the exception of BP, produced in 1955 ninety-four percent of Venezuela's output. The substitution of cheaper Middle Eastern crude for Venezuelan crude by these companies is mainly responsible for the fact that Venezuelan output[2] grew by sixty-one percent only between 1955 and 1966, while the combined output of the

four countries mentioned grew by one hundred and fifty percent.[3]

Table 6. Venezuela: Production of crude oil by Company, 1955-1966. Millions of Barrels.

Multinational company	Venezuelan subsidiary	1955	1957	1959	1961	1963	1965	1966
Jersey Standard	Creole	359	419	405	426	480	474	452
Shell	Shell	222	319	298	271	297	351	342
Gulf (50%) Jersey (25%) and Shell (25%)	Mene-Grande	116	148	135	140	148	150	140
Socony-Mobil Oil	Mobil	26	42	41	42	48	53	53
Texaco	Texas	18	17	20	22	28	30	30
	Texaco	-	-	6	24	16	36	38
	Others	46	69	106	141	201	174	175
Total		787	1014	1011	1066	1186	1268	1230
Percent Total								
	Creole	45.5	40.3	40.0	39.9	40.5	37.4	36.7
	Shell	28.2	31.2	29.5	25.4	25.1	27.7	27.8
	Mene-Grande	14.7	14.5	13.4	13.1	12.5	11.8	11.4
	Mobil	3.2	4.2	4.1	4.1	3.9	4.0	4.3
	Texas	2.2	1.6	2.0	2.1	2.3	2.4	2.5
	Texaco	-	-	0.6	2.3	1.3	2.9	3.1
	Others	6.2	8.2	10.4	13.3	14.3	13.6	14.2
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Petroleo, p. 58

Table six shows the overwhelming influence of these companies on the total output achieved by Venezuela. The three largest companies produced in 1955 eighty percent of Venezuelan output, and are controlled by Jersey, Shell, and Gulf. Their slow rate of growth within Venezuela associated with their high rate of growth in the Middle East was the chief influence depressing the overall rate of growth of Venezuelan production over this period. The share of the Big Three in total Venezuelan production actually fell in the period from eighty-nine to seventy-six percent, indicating that other companies grew at a higher rate than these. But these other companies control such a small portion of Venezuelan production that their generally high rate of growth did lift the total growth rate sufficiently to prevent a fall in Venezuela's share of world production.

The disposition and utilization of output

The Venezuelan oil industry remains overwhelmingly an export industry. Although there has been an increase over time in the proportion of output consumed locally, this increase has been only marginal: from five percent in 1950 for example to seven percent in 1966.

Table 7: Disposition of Crude Output, 1950-1966. Millions bbl.

Year	Output	Exported	--of which---		Domestic Consumption
			Crude	Refined	
1950	547	520	452	67	19
1960	1042	983	731	252	47
1966	1230	1161	826	335	66
Percent total					
1950	100.0	95.1	82.6	12.5	4.9
1960	100.0	94.3	70.1	24.2	6.7
1966	100.0	94.4	67.2	27.2	6.6

Furthermore, by far the bulk of production is exported in crude rather than in refined form. Although the proportion of output refined domestically doubled between 1950 and 1966, it was only thirty-five percent in the latter year.

The date on exports of crude by destination indicate broadly the location by country of the refineries owned by the multinational vertically integrated companies to which the crude exports of their

Venezuelan subsidiaries are shipped. Dominating the picture are the Dutch West Indian islands of Curacao and Aruba, which early in the life of the Venezuelan industry emerged as the sites of the refineries built by the two largest producers for the processing of their Venezuelan crude. However, in the past fifteen years, the absolute level of Venezuelan crude exported to these islands has remained virtually static, as Table eight shows, with the result that the proportion of total crude exports taken by them has shrunk from forty-seven to thirty-three percent.

The United States and Canada come next in order of importance as "markets" for crude exports, but, like the Dutch Antilles, the absolute level has hardly changed over the past ten years. In fact, one of the two principal areas to which the bulk of incremental crude exports has been directed is none other than the Caribbean itself. Exports to Central America and the Caribbean area increased their share of total crude exports from three to sixteen percent between 1955 and 1966. This increase was accounted for mainly by Trinidad-Tobago, Puerto Rico, and Panama.

Table 8. Crude exports by destination, 1955, 1966. Million bbl.

	Mn. bbl.		Percent	
	1955	1966	1955	1966
Total	591	826	100	100
Aruba	170	160	28.7	19.4
Curacao	106	111	17.9	13.4
U.S.A.	140	170	23.4	20.6
Canada	68	62	11.5	7.5
Trinidad-Tobago	17	53	2.9	6.4
Puerto Rico	3	41	0.5	5.0
E.E.C.	33	50	5.6	6.1
Other Europe	19	91	3.2	11.0

The other main area accounting for the bulk of incremental exports has been European countries outside of the E.E.C., principally the United Kingdom.

As a percentage of crude production, domestic refining increased from seventeen to thirty-five between 1950 and 1966. Table nine shows the expansion of refinery capacity by company between 1955 and 1966. In fact, for Jersey's subsidiary, refinery expansion absorbed more than the expansion of crude production between these two years, so that the absolute level of crude exports for this company probably fell. Refinery expansion also matched incremental crude output for Ven-Gulf, which

is associated with Mene-Grande, and for Mobil. For Shell, Texas, and Texaco, and the small companies, refinery expansion took place, but not as much as the expansion of crude output, so that the probably crude exports of these companies increased, thus accounting for the expansion of the absolute level of crude exports over the period.

Table 9. Refinery capacity by company.

Company	Refinery capacity (Mn. bbl.)		Refinery capacity % crude output		Crude output minus Refinery capacity	
	1955	1966	1955	1966	1955	1966
Creole	75	186	21	41	284	266
Shell	76	128	34	39	146	214
Ven-Gulf	21	58	18	74	95	82
Mobil	.05	29	0.2	55	26	24
Texas & Texaco	4	4	20	5	14	64
Others	14	37	30	31	16	138
Total	190	442	24	35	597	788

Source: Petroleo. p. 70

Petroleum In The Venezuelan Economy,

By any criterion, petroleum dominates the process of income creation in the Venezuelan economy. Table 10 shows some indicators of the industry's importance. Over the past seventeen years, it consistently contributed about one-fifth of the Gross National Product by Industrial Origin, and well over nine-tenths of merchandise exports. Exports, in turn, represent about one-third of the value of the G.N.P. Petroleum thus overwhelmingly dominates the export trade of this export-oriented economy.

The value of exports does not of course represent the true foreign exchange provided or income created for the Venezuelan economy. Tables 11 and 12 give indications of these. Foreign exchange charges on the export value amounted to 46 percent in 1955. The bulk of these werein respect of investment income accruing to the foreign companies, although imports of goods and services were also of some importance. The years 1956 to 1959 were years of considerable capital investment by the foreign companies, following the sale of substantial new concessions by the Government in 1956 and 1957. As a result, there was considerable reinvestment of profits in those years. Imports of goods and services, and total investment income,

TABLE 10

Indicators of Petroleum in the Venezuelan Economy

Gross National Product : Millions Bs.

	Total	Petroleum	Petroleum % Total
1950	10,560	2,004	19
1966	35,732	6,911	19

Exports

	Exports % G.N.P.	Petroleum % Exports
1950	33	96
1966	30	92

Government Revenue: Millions Bs.

	Total Government Revenue	From Petroleum	Petroleum % Total
1951	2,267	1,477	65
1966	7,651	4,999	65

TABLE 11

The Balance of Payments of the Petroleum Sector

U.S. $ Millions

	1955	1957	1959	1961	1963	1966
Exports, f.o.b.	1791	2570	2128	2276	2300	2158
Charges on Exports:						
Imports, f.o.b.	-135	-396	-158	- 58	- 98	- 50
Transport and Insurance	- 14	- 36	- 11	0	- 1	- 3
Investment income	-552	-887	-420	-477	-548	-600
Other Services	-103	-180	-111	- 59	- 50	- 63
Capital Movements	- 20	+803	+109	- 75	-111	- 21
Total Charges:	-824	-696	-591	-669	-815	-737
Charges as Percent Exports	46	27	28	29	35	34
Local Share Percent Exports	54	73	72	71	65	66

SOURCE: Venezuela, Petroleo... p.13

TABLE 12

Local Payments of the Petroleum Sector, 1952 - 1966.

Millions of Bolivares

	1952	1954	1956	1958	1960	1962	1965	1966
Gross Value	4636	5299	6773	7629	7289	7918	10980	10709
Local Payments:								
Taxes	1554	1635	2239	2712	3001	3224	4767	4999
Concessions	-	-	976					
Wages & Salaries	686	780	865	1040	1183	978	1108	1150
Local Purchases	664	892	802	1306	1773	1184	1738	1646
Total Local Payments	2719	3307	4882	5058	5959	5386	7613	7795
Indices:								
Taxes	100	105	145	175	193	207	307	322
Wages and Salaries	100	114	126	152	172	143	162	168
Local Purchases	100	134	121	197	267	178	261	248
Total	100	122	169	186	219	198	280	287
Gross Value	100	112	146	165	157	171	237	231

SOURCES : Extracted and calculated from data in Petroleo., , pp. 6, 13,129, and United Nations Economic Commission for Latin America: Economic Developments in Venezuela in the 1950's, pp. 28-29.

also increased; but the net effect was to reduce the foreign exchange charges as a share of the export value of the industry. The Local Share accordingly increased in the period of high capital investment by the industry. After the capital investment tapered off, imports of goods and of services shrunk. But the previous net inflows of capital were replaced by net outflows. The share of charges on the value of exports therefore increased, reducing the share of the national economy in the value of the industry's exports. Nonetheless, this share has remained in the 1960s, substantially in excess of that prevailing in 1955.

Local Payments: Taxes, Wages and Local Purchases.

By far the largest single item of local payments by the industry is tax payments, as Table 12 shows. Moreover, this was the fastest growing item of local payments, at least for the period 1952-1966. Tax payments have also increased faster than the Gross value of the industry's output, increasing its share of this value from 33 percent in 1952 to 47 percent in 1966. This was mainly responsible for the increase in the share of the Venezuelan economy in the value of the industry.

The history of the industry has in fact been marked by the Government's preoccupation with enlarging its tax take and with

devising just terms of collaboration between the industry and the national economy. The first concessions were granted in 1918. The first serious attempt to revise the terms of exploitation appears to have been made in the 1930s, when the Gomez Government negotiated a per unit royalty for oil produced from the pre-1918 concessions, and a royalty based on the value of output for post-1918 concessions. After this agreement the Government's take began to amount to about 13 percent of the value of production, and these payments amounted to about 35 percent of total Government revenue.[4]

The outbreak of the World War had the effect of severely reducing the Government's revenue from the industry. Exports fell because of the lower throughput; revenue per barrel also declined. Partly to counter this, the Government renegotiated the tax agreement to provide for a new system of pricing, a higher royalty and a small income tax. The new taxes were designed to increase the Government's total take from the industry as a whole, to 50 percent of profits.[5] In 1948 an amendment imposed the 50-50 profit sharing on each company individually; each company was now required, where its total taxes did not amount to at least 50 percent of profits, to pay an "additional tax" to bring it up that percentage.[6] The large increase in taxes which this helped to bring about was further augmented, in 1956 and 1957, by the Government's sales of new

concessions to the value of 2,100 million bolivares.

The overthrow of the Perez Jimenez dictatorship in 1958 brought to power a new, more democratic Government which proceeded to increase the rate of corporate income tax for companies in the top income bracket, from $28\frac{1}{2}$ to $47\frac{1}{2}$ percent. This had the effect of increasing the tax take to 69 percent by 1959.

After the pause in the growth of output in the early War years, Venezuelan production had continued to grow at a high rate after 1944. World consumption of petroleum was growing rapidly, and Venezuelan crude was substituting for the more expensive United States product in the United States itself and in Western Europe. In the 1950s, however, Middle Eastern crude began to displace incrementally Venezuelan petroleum in Western Europe and then in the United States as well, because of the low cost and the decline in shipping costs. In 1958, moreover, a condition of excess capacity emerged in the world oil industry. Prices began to weaken; in addition, the United States imposed an import quota on oil imports. The increase in the differential between the "Tax-paid" costs of Venezuelan and Middle East crude to the companies, therefore, came at a time when prices were falling, the market was tightening, and the chief export market for Venezuelan crude was restricted.

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After the pause in the growth of output in the early War years, Venezuelan production had continued to grow at a high rate after 1944. World consumption of petroleum was growing rapidly, and Venezuelan crude was substituting for the more expensive United States product in the United States itself and in Western Europe. In the 1950s, however, Middle Eastern crude began to displace incrementally Venezuelan petroleum in Western Europe and then in the United States as well, because of the low cost and the decline in shipping costs. In 1958, moreover, a condition of excess capacity emerged in the world oil industry. Prices began to weaken; in addition, the United States imposed an import quota on oil imports. The increase in the differential between the "Tax-paid" costs of Venezuelan and Middle East crude to the companies, therefore, came at a time when prices were falling, the market was tightening, and the chief export market for Venezuelan crude was restricted.

As already indicated, the companies accelerated the process of incremental substitution of Middle Eastern crude for Venezuelan in their input mix. In the following years neither output nor prices in the Venezuelan oil industry were as bouyant as had been characteristic of the post-War period. The value of sales rose only sluggishly in the six years between 1958 and 1963; in 1964 a rise in output raised the value to a new level which did not grow significantly in 1965 and 1966. The decline in per unit current and depreciation costs in the 1960s, on the other hand, together with the high marginal rate of taxation, raised the tax take faster than the value of sales. This partially "cushioned" the effects of sluggish output and prices on tax revenue.

The 1958 agreement had not ended the Government's concern with its tax take. For in the following years the companies, in order to maintain sales, had felt obliged to give substantial discounts below their "posted" (i.e. market quotation) prices for petroleum on a large part of their sales and the "posted" prices were, in any case, weakening. Income tax was paid on actually realised, not "posted" prices; so that "if the company was obliged to accept a discount in order to sell the oil, the Venezuelan exchequer, in theory, bore 65 percent of the cut."[7] Negotiations were reopened with the companies, and a new agreement in 1966 placed prices for tax purposes on a so-called "tax

reference" basis, extracted U.S. $ 560 million in back taxes, and raised the rate of income tax to 52 percent. The last change had the effect of raising the total take of the Government to about 72 percent of profits.*

The effect of rising prices and output up to the late 1950s, falling costs in the 1960s, and the succesive and substantial rises in the tax rate; was to introduce a bonanza of oil revenues to the Venezuelan Government. As a proportion of its total ordinary revenues, oil revenues increased from around one-third before the War to two-thirds during most of the post-War period. In the ten years between 1948 and 1957, the Economic Commission For Latin America estimates that the total revenue collected by the Government from all sources, 25,000 million bs, exceeded the accumulated total of the country's revenue since its colonization by Spain, and was more than three times the total of the grants and loans made by the U.S. Government and governmental organizations to the twenty Latin American republics from July 1945 to June 1958.[8] Of this total, the oil industry contributed 60 percent. These revenues enabled the Government to engage in enormous public spending, which became the most important source of incremental money demand in the economy.

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* United Nations: E.C.L.A., Economic Developments in Venezuela, op.cit., p.23.

Contribution to Labour.

The petroleum industry in Venezuela has exhibited the capital-intensity characteristic of most mineral resource industries operated by MNCs. In 1950, the industry employed 0.9 percent of the total population - possible 2 percent of the labout force. By 1966, the rise in the population and the fall in employment in the industry had reduced the proportion of the population employed in petroleum to 0.3 percent.

The striking features of the industry in the post-War period has been the severe cut in the employment it provides, and in its real labour input. Table 13 shows that for a more than twofold increase in crude oil production, and a more than threefold increase in refining, man-hour inputs into the industry fell by 47 percent between 1950 and 1966. The average hours worked per person employed fell during this period, nonetheless there was an overall cut in the industry's labour force of over 33 percent. This process of retrenchment, and of substantial capital/labour substitution in incremental capacity, severely reduced even the limited employment effect that the industry had in 1950.

The substantial rise in the labour payments of the industry was the result, partly of a large rise in wage rates, and to an even more significant extent because of the rise in the industry's contributions to employee benefits. Thus the total labour payments doubled, although the real labour input was halved. Nonetheless, labour payments did not rise as fast as the value of production, with the result that the labour's share in this value fell from 15 percent in 1952 to 11 percent in 1966.

Other Local Purchases.

Table 11 shows that the value of other local purchases by

the industry increased, though with fluctuations, slightly faster than the value of Gross output between 1952 and 1966. Even then, these local purchases formed only 15 percent of the value of Gross Output in the latter year.

The Petroleum Industry Of the Caribbean

The Netherlands Antilles.

The petroleum refining industry of the Netherlands Antilles was established by Jersey Standard and Royal Dutch/Shell. It was a direct extension of their Venezuelan oil activities. The two Dutch islands of Curacao and Aruba lie off the Venezuelan coast. Jersey and Shell found it convenient to process their Venezuelan crude for at least two reasons. One was the fact that the bar at the mouth of Lake Maracaibo prevented the passage of the large, ocean-going tankers which were required to transport the refined products to the world markets which Venezuelan petroleum served. By building refineries in the offshore islands the companies derived the benefits of processing near to the source of crude without the huge expenditure which would have been required to dredge the mouth of the Lake. The other factor was strategic considerations. Venezuela was an independent country subject to frequent and unpredictable

changes of Government; whereas the Dutch islands were firmly under Dutch rule.

Jersey Standard built its refinery for Venezuelan crude on the island of Aruba, Shell on the island of Curacao. The high rate of output achieved by these companies in Venezuela gave rise to a large capacity in the Dutch Antilles. This refining industry came to dominate the economy of the Antilles, as Table 14 shows.

TABLE 13 : Data on Employment and Remuneration in the Petroleum Industry

	1950	1966	Percent change
Production: Mn. barrels			
Crude Oil	547	1230	+124.9
Refined Products	91	428	+370.3
Employment: No. of Persons			
Total	44,335	29,448	- 33.6
Nationals	38,448	27,867	- 27.6
Expatriates	5,847	1,581	- 73.0
Labour Input: Millions Man Hrs.			
Total	110.5	58.6	- 47.0
Labour Income: Millions Bs.			
Basic Wages and Salaries	372.8	610.4	+ 63.7
Employer Contributions	189.9	539.6	+184.1
Total	562.7	1150.0	+104.4
Total Labour Income per Unit			
Per Employee: Bolivares	12,692	39,052	+207.7
Per Man-Hour worked: "	5.1	19.6	+284.3

SOURCE: Extracted and Calculated from Venezuela: Petrolero..., pp. 1, 15, 123, 124.

TABLE 14

Data on the Role of Petroleum Refining in the Economy of the Dutch Antilles

1. Foreign Trade: Mn. Gld. f.o.b.

	1950	1960	1965
Imports of Oil and Oil Products	964	1083	951
Percent total Imports	85	84	82
Exports of Oil and Oil Products	956	1223	1095
Percent Total Exports	99	98	96

2. Million gld.

Contribution to National Economy	1960	1963	1964	1965
Compensation of Employees	106	85	80	72
Taxes paid	12	12	12	12
Local purchases, contractors, pilot services, etc.	26	19	16	16
Total Local Payments	144	116	108	100

3. Local Payments

(i) Percent Export Value	11.8	13.6	9.3	9.1
(ii) Percent Net National Product	33.3	27.4	25.8	24.1

4. Employment: No. of Persons

1952	1960	1961	1962	1963	1964	1965
21,101	11,465	10,276	9,657	8,712	7,600	6,300

5. Indices

	1960	1961	1962	1963	1964	1965
Export Value	100.0	107.8	104.2	100.0	94.7	89.5
Local Payments: Total	100.0	N/A	N/A	80.6	75.0	69.4
(i) Compensation of Labour	100.0	N/A	N/A	80.2	75.5	67.9
(ii) Taxes	100.0	100.0	100.0	100.0	100.0	100.0
(iii) Other Local Payments	100.0	N/A	N/A	73.1	61.5	61.5
Numbers Employed	100.0	89.6	84.2	76.0	66.2	54.9

SOURCE: Extracted and calculated from Netherlands Antilles: Statistisch Jaarboek, 1966.

TABLE 15

Data on the Relationship between the Dutch Antilles Refining Industry and the Venezuelan Petroleum Industry.

1. Venezuelan Exports of Crude Oil to the Dutch Antilles.

Year	Dutch Antilles	Company	Exports: Mn. Barrels	
			1955	1966
1955	Aruba	Jersey (Creole)	160	169
	Curacao	Shell	111	106

2. Venezuelan Output and Refinery Capacity by Company. Mn. Bbl.

	Output		Refinery Capacity		Output Minus Refinery Capacity	
	1955	1966	1955	1966	1955	1966
Jersey Standard Creole	359	452	75	186	284	266
Shell	222	342	76	128	146	214

SOURCES : As for Tables 6 and 9.

In 1960, oil refining accounted for one-third of the net national product, in 1950 for 85 percent of all imports and 99 percent of all exports. This was essentially the result of the process of establishment and expansion of refineries by the two MNCs in Aruba and Curacao. But the "Golden Age" of prosperity for the Antilles ushered in by oil turned out to be short-lived. In the post-War period there was little or no expansion of refinery capacity by the MNCs in the Antilles. On the one hand, it began to prove difficult to expand exports from the Antillean refineries to Western Europe and the United States, the main markets. This was because Western Europe embarked on a programme of self-sufficiency in oil products, refined domestically from crude imported more and more from the Middle East. Cheap Middle Eastern crude also began to flow in large quantities into the United States, where refinery capacity was expanded.

On the other hand, the MNCs came under growing pressure from the Venezuelan Government to process a higher share of their Venezuelan crude output domestically. Where the consuming country insisted on importing crude for domestic refineries, the MNCs could obviously claim justification for exporting Venezuelan crude without processing. But this was not the case for the Antillean

refineries, which were established for export. The refining industry in the Dutch Antilles, was, therefore, "sandwiched" between the insistence of consuming countries that refining should be done domestically, within the country of consumption, and the pressure by Venezuela that refining should be done domestically, within the country of production.

Table 15 shows this in greater clarity. In the case of Jersey Standard, whose refinery is located in Aruba, more than all of its incremental output between 1955 and 1966 was processed in incremental refinery capacity built within Venzuela. Exports to Aruba therefore hardly changed over this period . In the case of Shell, exports to Curacao actually fell slightly between these two years. 43 percent of Shell's incremental output between 1955 was processed within Venezuela; the remainder was exported, but not to refineries in Curacao.

Thus, between 1950 and 1966, activity in the Antillean refining industry remained virtually static. But the contribution of the industry to the national economy declined. For one thing, substantial capital/labour substitution took place, reducing the industry's labour forces from 21,101 in 1952 to 6,300 in 1965, a cut of 70 percent in employment. This is consistent with the tendency in the mineral resource industry, already observed in Jamaica and Venezuela, for capital/labour substitution to take place over time.

In the Dutch Antilles the fact that output was not growing while capital/labour substitution took place caused the cut in employment to be particularly severe. And since employment by the industry had been the major source of employment in the Antilles, this cut had had severe effects on the total level of employment. In 1960, the number unemployed was 8,535 or 14.2 percent of the economically active population. The total cut in the industry's labour force between 1952 and 1960 had been 9,636. Clearly, therefore, the cut in employment in oil refining must have been a major contributor to the growth of open unemployment in this period. Moreover, in 1960 employment in the refineries was still 22 percent of total employment, but in the next five years the number employed in the refineries fell by 45 percent.

Unlike Venezuela and Jamaica, payments to labour in the Antillean industry far exceed tax payments. This is probably because the value added and the profit earned per unit of refined products is much lower than they are per unit of crude produced. As a result, labour payments, rather than taxes, are the by far the largest item of local payments: 74 percent in 1960, for example. The substitution of capital for labour and the resultant fall in employment brought about a severe fall in total labour payments,

although, since there was some advance in wage rates, the fall was not as great as the total number employed (see Table 14). The fall in labour payments, moreover, was in no way compensated for by an increase in taxes, and between 1960 and 1965 other local payments also declined. The absolute level of Local payments therefore, fell by 30 percentage points between 1960 and 1965. As a share of the industry's export value, and in the net national product, local payments also fell.

Between 1960 and 1965 the national income of the Dutch Antilles fell by 6 percent, from 401 million guilders to 377 guilders[9]. Population grew by 8 percent, so that per capita income fell by 14 percent in this five-year period. In 1960 local payments by the oil refining industry constituted 33 percent of the net national product at market prices; in the following five years, these payments themselves declined by 30 percent, and their contribution to the N.N.P. to 24 percent. It seems likely, therefore, that the fall in the industry's local payments was chiefly responsible for the fall in the national income of the Antilles at least, since 1960, and possibly from before that time.

The Petroleum Industry of the Caribbean

3. Trinidad and Tobago.

Trinidad is an offshore island of the Venezuelan coast which happened to fall under British colonial rule in the early nineteenth century. Its oilfields are, geophysically, extensions of the oil regime of Venezuela; and are less productive and fewer in number. Trinidad therefore, has never been a major producer of oil in terms of world production; but the industry is large in relation to the national economy and therefore, plays an important part in it.

Table 16 shows the salient statistics for the Trinidad petroleum industry since 1942. Three phases can be distinguished for the industry since that year. From 1942 to 1951 production of crude hardly changed. Refinery throughput had been in balance with crude output in 1942, so that all of Trinidad's production was processed domestically, and since local consumption was insignificant, virtually all of the refined products was exported. But after the War there began a marked rise in refinery throughput, fed by the start and growth of imports of crude oil.

SALIENT STATISTICS ON TRINIDAD PETROLEUM

(In Million Barrels)

	Crude Production	Crude Exports	Crude Imports	Refinery Throughput	Refinery Production	Local[1] Consumption	Refinery Exports
1942	22.0	---	0.1	21.9			19.1
1946	20.1	0.3	2.9	22.7			20.2
1947	20.4	0.9	5.9	25.3			22.0
1948	20.1	1.7	8.8	27.1			24.5
1949	20.6	2.0	11.3	29.6			27.4
1950	20.6	2.2	11.2	29.8			26.6
1951	20.8	1.9	16.0				
1952	21.3	2.0	16.9				
1953	22.3	2.3	16.8	37.4	36	12.3	21.9
1954	23.6		16.7	36.9	35.6	10.8	21.5
1955	24.9	2.9	17.8	40.1	38.6	10.5	25.4
1956	28.9		20.1	44.9	43.4	10.8	30.8
1957	34.1	3.4	19.5	50.5	49.04	10.9	34.8
1958	37.4		25.5	60.3	59.04	13.2	45.3
1959	40.9	3.3	31.4	68.1	67.6	16.1	
1960	42.4	5.1	40.2				
1961	45.8	4.3	62.3				
1962	48.9	4.0					
1963	48.7	3.8	74.1	119.7	115.9		103
1964	49.7	3.4	83.2	127.5	122.9		115.2
1965	48.9	4.5	93.4	137.2	132.5		128
1966	55.6	4.7	93.2	144.2	139.7		131

Sources: Trinidad Administration Report, Department of Petroleum and Mines, Annual Statistical Report

1, includes Bunker Fuel and Refinery Fuel

CRUDE PRODUCTION BY COMPANIES

Millions of Barrels

	Total	B.P. Ltd.	Texaco	Shell	Prem. Con.	Trinidad[3] Northern	Trin. Can.
1942	22.0						
1946	20.1						
1947	20.4						
1948	20.1						
1949	20.6						
1950	20.6	6.3	6.0	5.5	0.4	-	1.2
1951	20.8	6.7	6.0	5.4	0.4	-	1.1
1952	21.3	7.2	6.0	5.3	0.4	-	1.1
1953	22.3	7.2	6.1	5.4	0.4	-	1.5
1954	23.6	7.3	6.4	5.9	0.4	0.1	1.6
1955	24.9	7.5	6.4	6.5	0.4	0.4	1.5
1956	28.9	8.2	6.8	7.3	0.4	0.6	1.6
1957	34.1	8.5	10.6	9.1	0.4	1.0	1.8
1958	37.4	9.4	14.4	8.0	0.4	2.0	1.6
1959	40.9	10.1	17.7	7.4	0.4	3.8	1.5
1960	42.4	10.0	17.2	7.2	0.4	6.0	1.3
1961	45.8	10.4	17.9	6.4	0.3	9.4	1.2
1962	48.9	10.2	18.4	5.6	0.3	13.1	1.2

CRUDE PRODUCTION BY COMPANIES

Millions of Barrels

	Total	Dominion	Jones/Jade	Stan. Oil	Antilles	T.P.D. Co.
1942	22.0					
1946	20.1					
1947	20.4					
1948	20.1					
1949	20.6					
1950	20.6	-	-	0.7	0.6	
1951	20.8	-	0.006	0.7	0.6	
1952	21.3	-	0.007	0.6	0.7	
1953	22.3	-	0.004	0.6	1.2	
1954	23.6	-	0.002	0.6	1.3	
1955	24.9	-	0.00009	0.9	1.3	
1956	28.9	-	-	1.6	2.4	
1957	34.1	0.0001	-	--*	2.7	
1958	37.4	0.001	-		** 1.6	
1959	40.9	0.04	0.001			
1960	42.4	0.2	0.001			
1961	45.8	0.1	0.0009			
1962	48.9	0.02	-			

TABLE 17 (cont'd)

CRUDE PRODUCTION BY COMPANIES

	Crude Mill. Bbl.	B.P. Ltd. Mill. Bbl.	Texaco	Shell	Prem. Con.	Trinidad Northern	Trin. Can.
1963	48.7	8.4	18.4	5.4	0.4	15.3	1.0
1964	49.7	3.5	17.4	4.9	0.4	16.6	0.9
1965	48.9	3.4	17.6	4.8	0.3	15.7	0.8
1966	55.6	3.4	22.8	4.7	0.3	17.4	0.7

(Table continued on following page)

TABLE 17 (cont'd)

CRUDE PRODUCTION BY COMPANIES

	Crude Mill. Bbl.	Dominion	Jones/Jade	Stan. Oil [2]	Antilles[1]	T.P.D. Co.
1963	48.7	0.03	-			
1964	49.7	0.06				6.0
1965	48.9	0.0008				6.3
1966	55.6	0.01				6.2

1. Oroupouche and Brighton included in Antilles, not Texaco, for 1950 - 58.

2. Quinam included in Standard Oil, not Texaco, for 1950 - 58.

3. Marine Production by the three majors.

* Figure represents January - June '58, after which Antilles included in Texaco's production.

** From '57 onward Standard Oil included in Texaco's production.

The next phase begins in 1952 and lasts until about 1962, and is again distinguished by the behaviour of crude output. In these eleven years crude production grew by 135 percent. At the same time refinery throughput also grew, by an absolutely greater amount. The ratio of crude output to refinery throughput, which had been 100 percent in 1942 and had fallen to 69 percent in 1950, fell to 41 percent in 1963. From 1962 to 1965, crude production was stable at around 49 million barrels. But refinery throughput continued to climb, reducing the ratio of crude to throughput to 37 percent by the latter year. Thus, over the period, Trinidad was transformed from being an exporter of refined products based on indigenous crude to an exporter of refined products based on imported crude.

Crude Production By Company.

Three of the major MNCs which control the international petroleum industry together control the Trinidad industry. These are British Petroleum, Texaco, and Shell. The British connections of B.P. and Shell are consistent with the fact that the political metropolitan connection of Trinidad was with Britain. The three companies named produced 91 percent of Trinidad's crude output in 1950, and 87 percent in 1966.

Table 17 gives the breakdown of crude output by company since 1950. The important units to examine are B.P., Texaco, Shell, and the consortium called Trinidad Northern Area, which works the marine concessions.

In 1950 there was no marine production; crude production from land wells was shared fairly equally between the three majors in that year. Up until 1956, B.P. and Shell shared the bulk of output increases between them. But after that year, Texaco's production climbed quickly, partly, but by no means wholly, because of its acquisition of wells from Standard Oil and Antilles after 1958. Land production by Shell declined steadily after 1o57. This did not reduce total output because marine output was growing, as was land production by Texaco and B.P. But by the turn of the decade B.P.'s land production stopped climbing, and began to decline rapidly after 1962. Total production has only been prevented from falling by the steady rise in marine production. In 1966, though, the rise in total output was due for the most part to the rise in marine output.

Refinery Capacity By Company.

The Trinidad refining industry is dominated by the activities of Texaco. Of the three refineries in the country, at Point-a-Pierre, Brighton and Point Fortin, the first two are owned by Texaco, and represented 86 percent of total refinery capacity in 1963.

Texaco's activities are concentrated in the giant refinery purchased from the Trinidad Oil Company in 1956. At this time the turmoil in the Middle East over Suez considerably reduced the reliability of production in and transport from the Middle East. The throughput of the refinery at this time just over 29 million barrels per year, about 64 percent of total throughput in the country. One-fifth of its feed was already provided by Texaco. The company proposed to expand its capacity; in fact by 1963, capacity had been almost quadrupled to 109 million barrels a year, about 90 percent of the country's throughput.

Central to this expansion was special agreement under which Texaco Trinidad processed crude for its foreign affiliates, through the intermediation of Texaco Export Incorporated, one of the subsidiaries of the mother company.

TABLE 18

Data on the Refining Industry, 1962, 1963. Mn. Bbls.

Runs to stills

	1962	1963	Percent: 1962	1963
By refinery :				
Shell	17	17	15	14
Texaco	92	103	85	86
Total	109	120	100	100
By Source:				
Indigenous	44	46	37	38
Imported: Total	69	74	63	62
(a) Own Imports	12	12	11	10
(b) Under License	53	62	52	52

SOURCE: Government of Trinidad and Tobago : Report of the Commission of Enquiry into the Oil Industry of Trinidad and Tobago, 1963 - 1964., p.24.

TABLE 19

CRUDE IMPORTS --- QUANTITY 000 BARRELS

	Total	Venez.	S. Arabia	Colombia	Indonesia	Brazil
1950						
1	16013.5	14445.8	-	853.4	-	-
2	16949.3	15695.3	-	1014.2	-	-
3	16553.2	15134.0	-	872.8	-	-
4						
5	17783.8	17079.1	-	704.7	-	-
6						
7	18538.0	16159.6	181.3	1997.0	-	-
8						
9	31641.5	23402.6	3062.4	2311.3	1169.0	1297.1
1960	40218.4	27434.5	9328.9	2241.2	523.9	360.3
1	62847.3	30523.1	27175.6	4366.1	782.5	-
2	64588.2	27936.9	32114.9	4359.4	-	-
3	69855.9	29827.4	27253.0	11211.5	-	-
4	86281.5	40912.0	31484.0	12949.4	235.0	-
5	93398.2	46748.5	33967.4	11986.4	-	-
1966						

TABLE 1 (cont'd)

CRUDE IMPORTS --- PERCENT TOTALS

	Total	Venez.	S.Arabia	Colombia	Indonesia	Brazil
1950						
1	100	90.2		5.3		
2	100	92.6		5.0		
3	100	91.4		5.3		
4	100					
5	100	96.0		4.0		
6	100					
7	100	87.2	1.0	10.8		
8	100					
9	100	74.0	9.7	7.3	3.7	4.1
1960	100	68.2	23.2	5.6	1.3	0.9
1	100	48.6	43.2	6.9	1.2	
2	100	43.2	49.7	6.7		
3	100	42.7	39.0	16.0		
4	100	47.4	36.5	15.0	2.7	
5	100	50.0	36.4	12.8		
1966	100					

TABLE 20

THE PETROLEUM SECTOR IN TRINIDAD-TABAGO

	Percentage of G.D.P.	Percentage of Government Revenue	Percentage of Imports	Percentage of Exports
1951	30.0	35.0	29.8	75.4
1952	28.6	35.1	29.2	76.4
1953	31.4	34.0	27.6	75.7
1954	29.3	31.3	26.2	73.7
1955	29.2	33.9	25.0	74.4
1956	33.6	34.1	25.3	79.4
1957	36.0	30.9	24.7	80.7
1958	32.4	41.2	28.2	79.9
1959	32.7	33.1	29.2	81.1
1960	30.4	32.6	31.4	79.9
1961	30.0	33.5	45.6	83.2
1962	29.0	30.6	44.8	83.5
1963	27.6	28.9	45.2	82.0
1964	27.5	27.6	49.4	81.7

In 1963 six-tenths of Texaco's throughput was on account of Texaco Export, and eight-tenths of the company's total imports of crude for processing. The remainder was imported for processing from Creole Petroleum, Jersey Standard's subsidiary in Venezuela.

The bulk of Texaco Export's crude for processing in Trinidad came from company-owned sources in Venezuela (about 19 percent in 1963) and Saudi Arabia (39 percent in 1963). Thus, through the intermediation of the MNC, Trinidad "acquired" a large petroleum refining industry based on Saudi Arabian and Venezuelan crude oil.

Table 19 shows how this affected the growth and changes in the structure of crude oil imports. Imports from Venezuela grew from 16 to 47 million barrels between 1951 and 1965; imports from Saudi Arabia did not begin until 1959, but within seven years had grown to 34 million barrels, 36 percent of total crude oil imports by value.

Role In The National Economy.

Because of its large size relative to that of the national economy, the petroleum sector dominates the economy of the Trinidad-Tobago. Bais data on the role of the industry is given in Table 20. In 1951 the petroleum sector provided roughly

TRINIDAD AND TOBAGO

NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT

113 - PETROLEUM

TABLE 43

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
41-1	Value of exports by this industry (domestic produce)	194.3	213.5	263.4	315.5	341.3	366.7	400.7	503.1	507.2	536.4	588.4
41-2 minus	Imported intermediate inputs embodies in exports	67.1	76.6	80.6	89.6	117.7	132.2	158.2	247.3	260.5	283.2	346.3
41-3	Net Value of exports by this industry (41-1 minus 41-2)	127.2	136.9	182.8	225.9	223.6	234.5	242.5	255.8	246.7	253.2	242.2
41-4 minus	remitted and retained profits of foreign-owned enterprises in this industry	27.5	29.7	64.4	103.8	68.6	94.4	70.0[e]	106.5	105.2	102.0[e]	105.0[e]
41-5 minus:	remitted salaries by foreign-owned firms in this industry	1.1	1.7	1.5	1.6	1.8	3.1	2.7	3.0	3.1	4.2	4.3
41-6 minus:	foreign rents and royalties	1.5[e]	1.6	1.6	2.9	3.6	3.8	4.3[e]	4.8[e]	5.2[e]	5.7[e]	6.2[e]
41-7 minus:	capital consumption provisions of foreign-owned firms in this industry	27.2	33.9	43.0	36.8	48.8	56.2	73.1	72.8	79.9	80.0[e]	82.2

(CONT'D)

TRINIDAD AND TOBAGO

NET DOMESTIC AND CURRENT NATIONAL CAPACITY TO IMPORT

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TABLE 43 (cont'd)

$ W.I. mn.

		1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
41-8	National Export earnings of this industry	71.4	70.0	74.3	80.0	100.9	77.0	92.4	68.6	53.3	61.3	44.5
41-9 q	Price index of imports excluding imported intermediate inputs going into exports	100.	102.9	106.2	103.7	103.6	103.3	118.7	149.8	152.6	133.4	130.6
41-10	Constant dollar value of the net value of exports by this industry	127.2	133.0	172.1	217.8	215.8	227.0	204.3	170.8	161.7	189.8	185.4
41-11	Constant dollar value of national export earnings of this industry	71.4	68.0	68.1	77.9	97.4	74.5	77.8	45.8	34.9	45.9	34.1
41-12	Net Domestic Capacity to Import of this industry	100.0	104.5	135.3	171.2	169.6	178.4	160.5	134.2	127.0	149.2	145.7
41-13	Current National Capacity to Import for this industry	100.0	95.2	95.4	109.1	136.4	104.3	109.0	64.1	48.9	64.3	47.8
	Index	100	105.2	126.2	146.2	163.7	178.9	177.3	199.9	196.9	217.7	234.7

Source: Repeated from Deydestere, above, Table 43.

one-third of the G.D.P. by Industrial Origin, of Government revenue and of imports; and contributed three-quarters of total exports. Over the next fourteen years the importance of the industry in foreign trade increased, as imports of crude for processing, and exports of dpmestic crude based on imported crude became significant. The rising importance of the industry in foreign trade was, however, associated with a falling share in the G.D.P. and in Government revenue. In large part, this is due to the fact that the tax revenue yielded, and the value added, is far less in the processing of crude than in its production; and the bulk of the expansion of the industry's foreign trade was connected with its role as a refiner of imported crude.

A truer picture of the role of the industry in the national economy is provided by the estimates of Gerard Dedeystere on its true contribution to the foreign exchange earnings of the national economy[10]. According to these estimates, which relate to 1957-1964, the value of export sales by the industry rose by 135 percentage points, but the net foreign exchange provided by the industry increased by 48 points only, while the current component of the foreign exchange contribution actually declined by 53 points. All the estimates have been deflated by an import price index. Thus, while the value of the industry's exports in

LOCAL PAYMENTS BY THE PETROLUEM SECTOR

(Millions of Dollars)

YEAR	TOTAL	TO GOVERNMENT	TO LABOUR	TO CONTRACTORS	PURCHASED MATERIALS	OTHER	IMPORTS
1941	18.5		9.0	2.4	4.2	2.9	7.0
1942	20.0		10.4	2.6	3.9	3.1	6.3
1943	25.9	5.8	11.7	3.0	3.1	2.3	5.0
1944	26.8	5.2	12.4	2.9	4.0	2.3	6.1
1945	27.3	5.7	12.8	2.4	3.8	2.6	6.6
1946	27.5	5.1	13.9	2.4	3.5	2.6	6.7
1947	31.9	7.1	14.7	2.9	4.0	3.2	11.6
1948	40.6	13.2	16.2	3.5	3.9	3.8	14.2
1949	52.3	19.3	17.1	4.5	4.3	7.1	23.4
1950	54.2	16.9	18.8	6.1	3.9	8.5	21.8
1951	66.0	22.4	20.9	7.5	4.8	10.4	22.3
1952	77.7	26.6	24.7	7.6	5.7	13.1	31.5
1953	79.6	25.6	29.2	7.4	5.9	11.5	30.9
1954	86.8	26.1	31.0	9.5	7.0	13.2	30.2
1955	96.9	30.6	34.6	10.6	7.2	13.8	31.3
1956	105.9	33.5	35.7	13.0	8.1	15.5	32.7
1957	130.6	46.1	37.6	17.1	9.2	20.7	47.2
1958	145.6	58.1	41.5	23.9	9.0	13.0	49.7

YEAR	TOTAL	PERCENT TOTAL TO GOVERNMENT	TO LABOUR	TO CONTRACTORS	PURCHASED MATERIALS	OTHER
1941	100		48.6	13.0	22.7	15.7
1942	100		52.0	13.0	19.5	15.5
1943	100	22.4	45.2	11.6	12.0	8.9
1944	100	19.4	46.3	10.8	14.9	8.6
1945	100	20.9	46.9	8.8	13.9	9.5
1946	100	18.5	50.5	8.7	12.7	9.4
1947	100	22.3	46.1	9.1	12.5	10.0
1948	100	32.5	39.9	8.6	9.6	9.4
1949	100	36.9	32.7	8.6	8.2	13.6
1950	100	31.2	34.7	11.2	7.2	15.7
1951	100	33.9	31.7	11.4	7.3	15.8
1952	100	34.2	31.8	9.8	7.3	16.9
1953	100	32.2	36.7	9.3	7.4	14.4
1954	100	30.1	35.7	10.9	8.1	15.2
1955	100	31.6	35.7	10.9	7.4	14.2
1956	100	31.6	33.7	12.3	7.6	14.6
1957	100	35.3	28.8	13.1	7.0	15.8
1958	100	39.9	28.5	16.4	6.2	8.9

Source: Department of Petroleum and Mines, Annual Report

the trade accounts more than trebled in the period, the true foreign exchange contribution, deflated by import prices, increased by one-half only. This considerably qualifies the impression given by the dominance of the industry on the External Trade Accounts.

An indication of the distribution of the industry's local payments is given in Table 22 for the years 1942 to 1958, at which time the published data ceased. It shows the growing importance of the Government's share of local payments over time. Around the time of the World War over one-half of local payments was on account of labour; but after the War payments of taxes, direct and indirect, by the industry, grew faster than payments of labour income , and exceeded the latter for the first time in 1957. The royalty element of taxes is fixed at 10 percent of the value per barrel of crude. It is therefore, a function of output and of prices; if prices are not falling, tax payments will grow as fast or perhaps faster than crude output. This is not necessarily the case for labour payments, which are a function of physical output, labour productivity and wage rates. If the rise of productivity outstrips the rise of wage rates, as happened in Venezuela and the Dutch Antilles, then labour payments per unit of output will fall. Certainly, given the observed tendency in

two other Caribbean oil producers, it would be surprising if labour payments grew as fast or faster than crude output. Hence the falling share of labour payments relative to taxes in local payments.

Payments to contractors and other purchases of materials increased in the early 1950s and then substantially in the 1956-1958 period. These were periods of substantial new capital investment in production and refinery capacity in the industry. The data are therefore consistent with those available from other mineral producing countries, which indicate that payments to the national economy other than taxes and wages, increase greatly during periods of high capital investment, and fall during periods of low capital investment.

The low degree of integration with the rest of the economy is shown clearly in Table 23. Only 3.4 percent of the sector's inputs in 1962 were purchased from other sectors in the economy; over one-half of purchases of domestic inputs were from the distribution sector, and may therefore, include imports. Direct imports by the sector represent 39 percent of the value of its output, profits and depreciation claim another 22 percent. The total local content of the industry's operations amount to 38 percent, but this includes a substantial portion of the oil industry's purchases from itself, on account of oil sold by some companies to others for domestic processing.

TABLE 23

Input Structure of Trinidad Oil Sector, 1962.

Input Structure	Percent Gross Output	
From:		
Oil	21	
Alcoholic Beverages and Tobacco	--	
Food Manufacturing	--	
Other Manufacturing	0.5	
Transportation	0.8	
Distribution	1.5	
Services	0.4	
Construction	--	
Public Utilities	0.3	
Sugar milling	---	
Cane	---	
Other Agriculture	---	
Banking and Finance		
Sub-Total	24.4	
Imports	39.3	
Wages and Salaries	6.9	
Government Taxes	6.6	
Depreciation	9.6	
Profits	13.1	
Sub-Total	75.6	
TOTAL	100.0	
Local Content:		
Materials	24.4	(includes 21% from Oil itself.)
Employment Income	6.9	
Taxes	6.6	
Total	37.9	

Some Conclusions: The Petroleum Industry Of The Caribbean.

The preliminary and cursory examination of the Caribbean petroleum industry here carried out yields significant results to justify further and deeper investigation. It is clear that the most important trends in output, refining, imports and exports for the countries concerned are, and have been, the subject of decisions taken by the large, vertically integrated multinational firms which control the industry. To be sure, the nature and occurrence of the petroleum deposits of the countries have influenced the development of their industries, but in ways which express themselves through the particular needs and opportunities of the MNCs at particular times. Much of these factors have yet to be uncovered; as the existing literature tends to be concerned more with the economies of nation-states than with the economies of the multinational corporations.

The similarity of the experience of these countries, and with the Caribbean bauxite industry, in the large share of export value which is denied the national economies, is also striking. Yet another feature is the observation that petroleum refining yields far less to the national economy, as a share of Gross output, than crude production; and the importance of the

Government's tax take in determining the size of the overall Local Share emphasises the importance of analysis of the tax arrangements made between the Governments and the MNCs, and the way in which the control of the industry by the MNCs affects the ability of the Government to make desirable arrangements.

Finally, the experience of Venezuela, the Dutch Antilles, and Trinidad-Tobago affords the opportunity of examining the "Golden Age", and the onset of secular stagnation, in these petroleum economies. Of particular interest here is the way in which the decisions of the MNCs affect the development of a "Golden Age" and the arrival of secular stagnation; and the way in which the "Golden Age" and secular stagnation affect the national economy.

NOTES

1. Hartshorn, op. cit. p. 65

2. 741 MN bbl.

3. In the case of at least one company, Shell, this substitution was absolute. Thus, P.R. Odell notes:
"Since 1958, it would seem that Shell has found it more profitable to take increasing quantities of Gulf's Kuwait oil than even to maintain its own production in Venezuela. From 1959 to 1961 ..... (the Shell Group) increased its purchases from Bulf by thirty-six percent from 20.5 to 28.0 million tons, while its production in Venezuela declined by seven percent from forty to thirty-seven tons."
An Economic Geography of Oil, London, G. Bell and Sons Ltd., 1965 p. 32

4. Hartshorn, op.cit., pp. 301 - 302

5. United Nations, Economic Commission for Latin America, Economic Developments in Venezuela in the 1950's. p.32.

6. Ibid.

7. Hartshorn, op.cit. p. 303

8. U.N. E.C.L.A. "Economic Developments in Venezuela", op.cit, p. 23.

9. See Statistisch Jaarboek, op.cit.

10. See Deydestere, above.

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